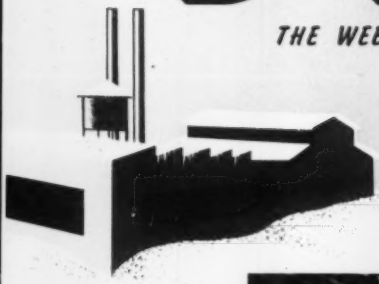
NOVEMBER 5, 1951

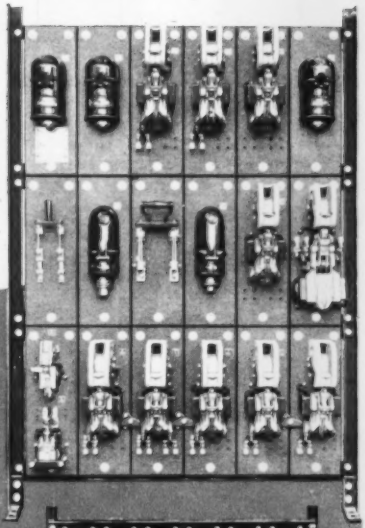
STEEL

THE WEEKLY MAGAZINE OF METALWORKING

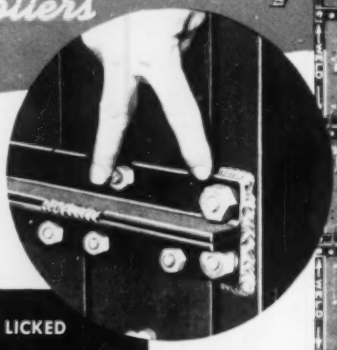


8 *Important Features of* **EC&M** *Magnetic Control*

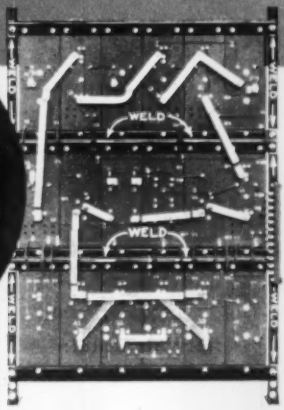
1. Time-Current Acceleration
2. Line-Arc Contactors
3. Wright Hoist Circuit
4. Tab-Weld Resistors
5. Cam Master Switches
6. Safer Electrical Interlocks
7. Bolted, Welded Frame
8. Quick Contact Renewing



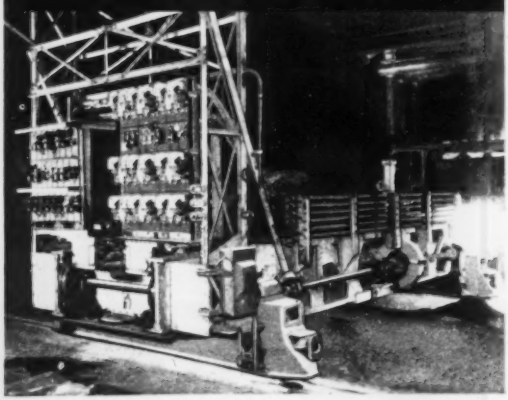
BOLTED and WELDED ANGLE-FRAME *on crane controllers*



The rigidly welded and bolted frame stands up under toughest use.



WHERE SHOCK AND VIBRATION ARE LICKED



EC&M Magnetic Controllers for cranes, ore bridges, charging machines, etc., use individual slate construction for contactors, relays and knife switches, with the slates bolted to the cross-angles of the controller framework.

The vertical and horizontal members of the angle-frame are both bolted and welded to form a strong, rigid assembly which, experience shows, is of major importance in successfully withstanding the shock and vibration of these traveling machines.

Many users report EC&M Controller construction is without equal for use on moving machines. Specify EC&M Control for your next application.

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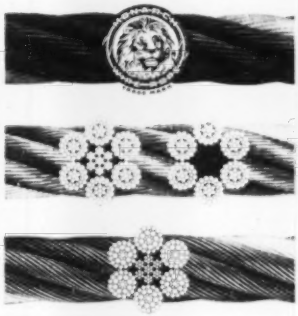

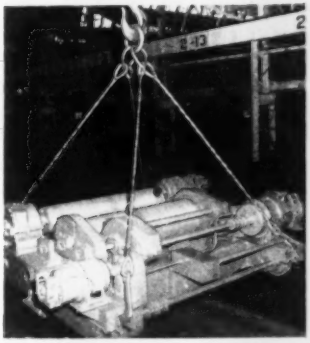

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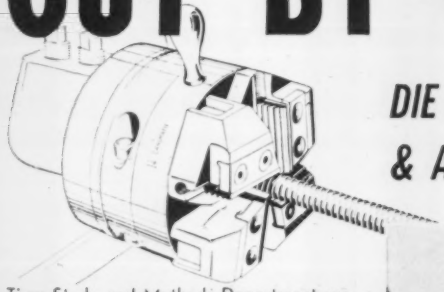
THREADING COSTS CUT BY OVER 75%



DIE HEAD CUTS COST OF PRODUCTION & ASSEMBLY OF STABILIZER SCREWS

Time Study and Methods Department records of a large aviation equipment company furnish data of still another job where LANDMATIC Heads have effected large savings in machine time and assembly and improvements in product quality.

In this operation, the 1¼" LANDMATIC Head on a turret lathe equipped with Leadscrew is cutting a ⅝-6 Acme thread on a Stabilizer Screw used by a light aircraft manufacturer. The thread was held to the close tolerance of ±.001 between the P.D. of the thread and the O.D. of the screw, for a full thread length of 5⅜" on cold-drawn piston stock, Spec. =AISI, B1112.

Former methods required two passes to produce the finished thread—one roughing and one finishing cut. The thread is now cut in one pass in .192 at a spindle speed of 230 R.P.M. Approximately 400 pieces are cut between chaser grinds. Hand fitting with the mating nut in assembly, previously necessary, has been eliminated. Total cost savings in all operations are in excess of 75%.

LANDMATIC Heads are stationary threading heads with self-opening action designed primarily for turret lathes. Their unusually-large oversize capacity makes them ideally suited for these machines. For detailed information and specifications, write for Bulletins F-80 and F-90.

LANDIS Machine COMPANY
WAYNESBORO, PENNA.

THREADING MACHINERY—THREAD CUTTING DIE HEADS—COLLAPSIBLE TAPS

STEEL
The Weekly Magazine of Metalworking

VOL. 129 NO. 19 NOVEMBER 5, 1951

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Editorial and Business Staff—Page 10. Advertising Index—Page 190. Editorial index available semiannually. STEEL also is indexed by Engineering Index Inc., 29 West 39th St., New York 18.

Next Week **... Broader Use of Hot-Sprayed Lacquer ... Standardized Components Cut Die Assembly Costs ... Casting Soundness Can Be Controlled ... Steel Warehouse Installs Cold Reduction Strip Mill**

Published every Monday by the Penton Publishing Company, Penton Building, Cleveland 13, Ohio. Subscription in the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $10; two years $15; all other countries, one year $20. Single copies (current issues) 50 cents. Metalworking Yearbook issue $2.00. Entered as second class matter at the postoffice in Cleveland, under the Act of March 3, 1879. Copyright 1951 by Penton Publishing Co.

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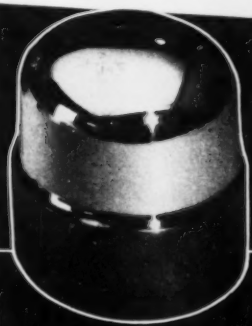
A SURE WAY TO PRODUCE MIRROR FINISHES, FASTER



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BOLTS
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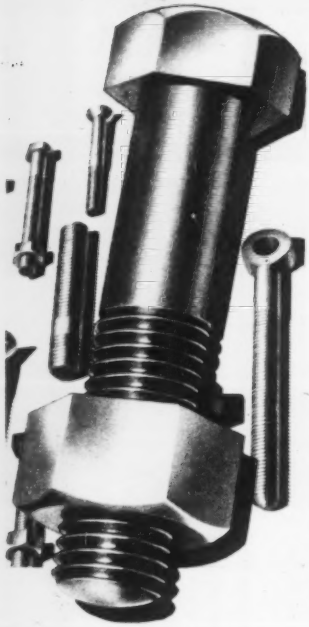
STUDS



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★ Stainless Steel
★ Silicon Bronze
★ Naval Brass
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Behind the Scenes...

Good Job

The people down in our Readers' Service Department are accustomed to getting all sorts of mail, but they were surprised a week or so ago to receive a check "for services rendered." Wynn Sullivan was the recipient. He had done such a good job in answering one firm's inquiries about cold forming steel that the company wanted to show its appreciation. The check was returned, of course, for the department's services are free.

Another letter arrived at the department addressed: Headquarters, 1213 W. Third St., Cleveland 13, O. The mailman brought it to the Readers' Service on the first try, and that was where it belonged because it asked about a book mentioned in STEEL. We don't recommend as casual an address as "Headquarters," etc., but you'll be sure of prompt attention if you write: STEEL, Readers' Service Department, 1213 W. Third St., Cleveland 13, O.

Ship Assignments

A while back we found ourselves short-handed, so we sent out on day assignment our night editor, Geraldine, who is also the highly competent cleaning woman in our building. Her job was to find out about the new ore carrier, *S. S. Tom M. Girdler*, which had just come into the Cleveland docks to unload her first cargo of ore for Republic Steel Corp. We reprint her notes just as she handed them in to us:

"Named after Republic's chairman. Converted in five months at a cost of $2 million from a C4 ocean-going vessel purchased from the U. S. Maritime Administration Reserve fleet at Ft. Eustis, Va. Two more coming: *S. S. Charles M. White* and *S. S. Troy H. Browning*. Originally 520 feet long, vessel was cut in half with cutting torches at Maryland Drydock Co., Baltimore. New forward half built by Ingalls Shipbuilding Co. at Pascagoula, Miss., and towed to Baltimore and joined to the after half by welding and riveting. Resulting length, overall—602 feet; beam—71 feet 6 inches; carrying capacity—14,500 gross tons; maximum speed—23 mph; crew—40. *Girdler* towed from Baltimore to New Orleans, up Mississippi and through Illinois Waterway into Lake Michigan.

Puzzle Corner

We've received some voluminous mail on the problem of determining a bad coin among 12 in just three weighings, as set for you in the Oct. 22 issue. First in with the correct answers were Bob Knop of Wolverine Tool Co., Frank O. Klapp of Sterling Grinding Wheel Division and someone from Republic Steel Corp.'s Youngstown division who forgot to sign his name. Here's one way to accomplish the job:

Weighing I: Weigh coins 1, 2, 3, 4 against 5, 6, 7, 8; weighing II— 4, 5, 6, 7 gainst 8, 9, 10, 11. When that has been done, you'll have one of five results. Possibility I—both weighings I and II balance, so No. 12 coin is the bad one; possibility II—weighing I balances, but weighing II does not, so coins 9, 10 or 11 are the bad coins; possibility III—weighing I doesn't balance but weighing II does, so 1, 2 or 3 are the bad coins; possibility IV—neither weighings I nor II balance but the imbalance is in the same direction, so coins 1 or 8 are bad; possibility V—neither weighings I nor II balance but the imbalance is in opposite directions, so coins 5 or 6 are bad. If your result is possibility I, No. 12 is bad, so check it against any other coin to see if it is light or heavy. In possibility II, check 9 against 10. If they balance, 11 is bad. If they are unbalanced in the same direction as in Weighing II, 10 is bad. If they are unbalanced in a direction opposite to the results obtained in weighing II, then 9 is bad. Whether the bad coin is heavy or light is indicated in weighing II. In possibility III, check 1 against 2. If they balance, 3 is bad. If they are unbalanced in the same direction as in weighing I, then 1 is bad. If they are unbalanced in the direction opposite to weighing I, then 2 is bad. Light or heavy is shown by the direction of imbalance in weighing I. In possibility IV, check 1 against 2. If it balances, 8 is bad; if not, 1 is bad. Weighing I and II will show whether it's light or heavy. In possibility V, check 1 against 5. If it balances, 6 is bad; if not, 5 is bad. Weighing I and II will show if it is light or heavy.

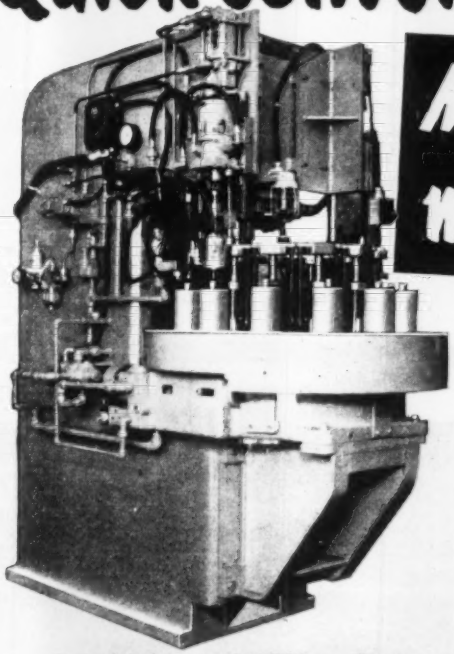
Frankly, it's quicker to check the coins a pair at a time and go as high as 11 weighings.

After that one, here's one of the shortest puzzles we can find: If a quantity of two digits is tripled and the digits added to the product, the result is the original quantity with the digits reversed. What is the original quantity?

Shrdlu

(Metalworking Outlook—Page 57)

Quick conversion cuts costs



MULTIPRESS® makes it easy!

Standard MULTIPRESS makes quick, automatic work of hydrostatic testing operation

The ingeniously tooled unit above is a striking example of the ease with which any standard Multipress can be adapted to changing needs. The press is equipped with a 12-station HydrOILic Index Table. At each station an oil-filled steel housing surrounds a spindle over which finished rocket bodies are inserted. At the index station just ahead of the press ram position, the rocket bodies are automatically screwed down and sealed shut by a hydraulic device attached to the press frame. Now ready for testing, the assemblies index under the press ram, where compression builds up terrific oil pressure within the rocket body. Units that hold up under these pressures are automatically die stamped and loosened from the fixtures by auxiliary hydraulic units interlocked with the press circuit. If failure occurs, the press stops instantly, a red warning light goes on, the marking device fails to operate, and the press is locked out of operation until authorized government personnel can inspect and record the failure, and reset the electrical system with a special key.

DENISON HydrOILics

Multipress has operating advantages and automatic control features that pay extra dividends *two ways!*

1. They meet armament production needs with higher speeds, quality control, and fewer rejects.
2. They make it easy to convert quickly to a wide range of civilian production needs, at any time.

Some of these Multipress features, *proved in more than 6000 applications*, include:

1. Automatic time delay, for ram dwell or similar needs.
2. Automatic inspection devices easily interlocked with the press hydraulic circuit.
3. Automatic Index-Table Feeds permit one, two or several operators to load fixtures at up to twelve stations while parts are being processed under the press ram. Other automatic feeds also available.
4. One or more auxiliary operations (as in the job described at left) can be handled by devices attached to the press frame and interlocked with the hydraulic circuit of the Multipress itself.
5. Safety is provided by several Multipress features. The ram is under complete, split-second control throughout its entire sequence. With Multipress Index-Table Feed, operator's work is removed from the ram area.
6. Low initial cost plus relatively low cost of adding interlocked auxiliary units and accessories cut costs of "tooling up" for specific operations.
7. Full, stepless adjustability and accurate control of the ram's speed, pressure, and stroke length assure easy adjustment to changing production needs.

These are only a few of the Multipress features that cut production costs *and save time and money* whenever you convert from one type of production to another. Deliveries too, are better when standard presses can be utilized.

Multipress is available in eight frame sizes, with capacities of 1, 2, 3, 4, 6, 8, 10, 15, 25, 35, and 50 tons. Standard accessories for numerous special needs. Write today.

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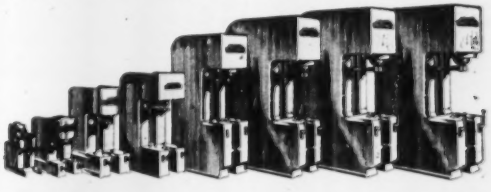

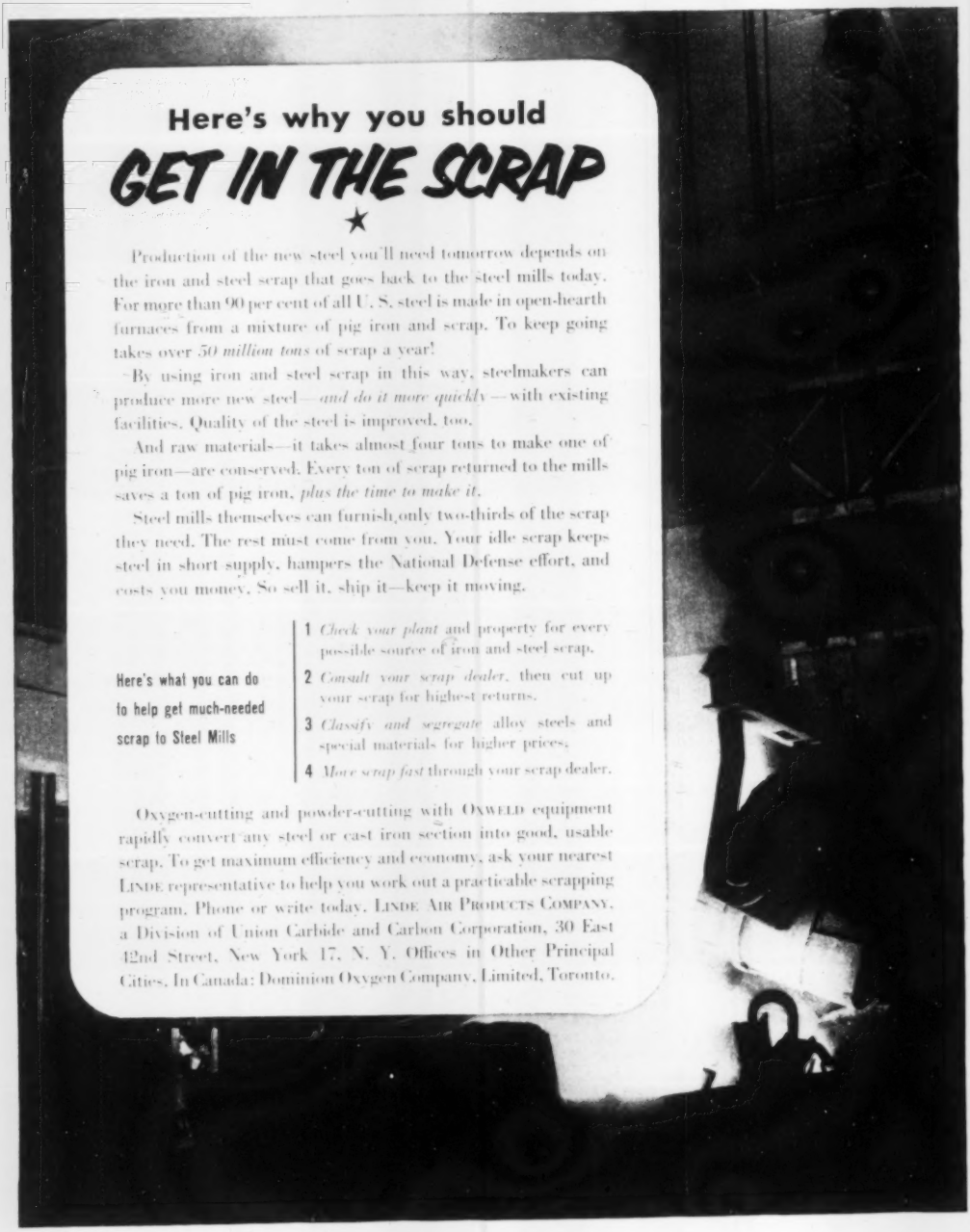

Here's why you should

GET IN THE SCRAP

★

Production of the new steel you'll need tomorrow depends on the iron and steel scrap that goes back to the steel mills today. For more than 90 per cent of all U. S. steel is made in open-hearth furnaces from a mixture of pig iron and scrap. To keep going takes over *50 million tons* of scrap a year!

By using iron and steel scrap in this way, steelmakers can produce more new steel—*and do it more quickly*—with existing facilities. Quality of the steel is improved, too.

And raw materials—it takes almost four tons to make one of pig iron—are conserved. Every ton of scrap returned to the mills saves a ton of pig iron, *plus the time to make it.*

Steel mills themselves can furnish only two-thirds of the scrap they need. The rest must come from you. Your idle scrap keeps steel in short supply, hampers the National Defense effort, and costs you money. So sell it, ship it—keep it moving.

Here's what you can do to help get much-needed scrap to Steel Mills

1. *Check your plant* and property for every possible source of iron and steel scrap.
2. *Consult your scrap dealer*, then cut up your scrap for highest returns.
3. *Classify and segregate* alloy steels and special materials for higher prices.
4. *Move scrap fast* through your scrap dealer.

Oxygen-cutting and powder-cutting with OXWELD equipment rapidly convert any steel or cast iron section into good, usable scrap. To get maximum efficiency and economy, ask your nearest LINDE representative to help you work out a practicable scrapping program. Phone or write today. LINDE AIR PRODUCTS COMPANY, a Division of Union Carbide and Carbon Corporation, 30 East 42nd Street, New York 17, N. Y. Offices in Other Principal Cities. In Canada: Dominion Oxygen Company, Limited, Toronto.

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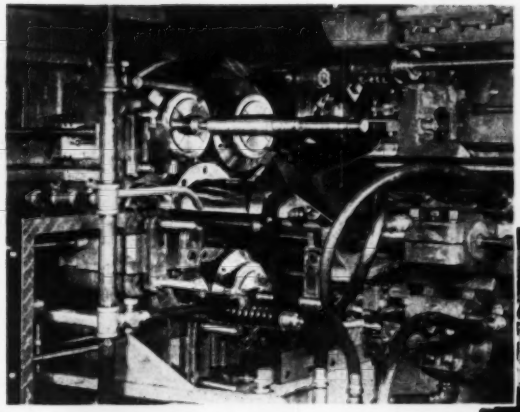
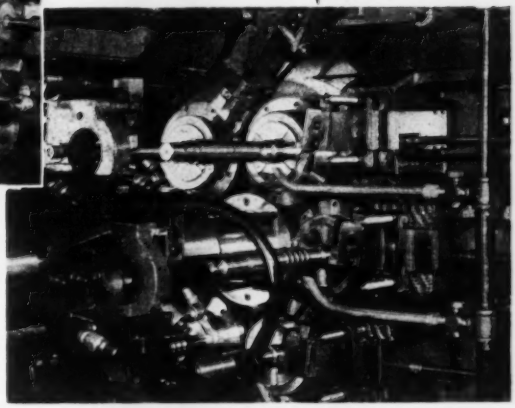
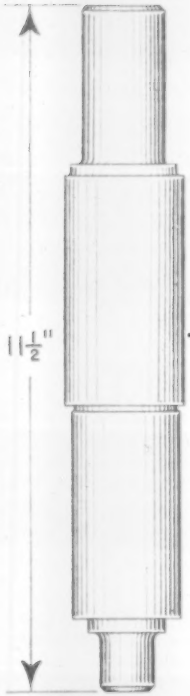


Tooling Area 3½-SIX
Front Side Rear Side





Automotive Transmission Shaft

A very good reason why CONOMATICS handle a wider variety of machining operations per single chucking is their greater number of tooling positions.

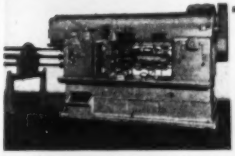
WITH MORE TO SELL THERE'S MORE TO TELL

Whether you're selecting a new golf club, motor car, or multiple spindle bar automatic, you want what best fits into the "scheme of things."

Before you can be sure that any product will meet your requirements you must have information. And you can judge only by that at hand or available. Complete information lets *you* decide what's important to *you*. That's as it should be.

There's always more information to be had about the product that has more to offer. It's that way about CONOMATICS. And you can always have *complete* information. If you will write, wire, or phone, you can have it now.

A Comparison of ALL Automatics is in favor of Cone



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Kidde "Heat Detector" 24 hours a day this sensitive detector stands guard ready to set off a Kidde CO_2 system automatically if fire should strike.

Kidde Carbon Dioxide Portable. Fast-acting . . . easy to use. A pull of the trigger releases a rolling fog of CO_2 gas that smothers flame instantly.

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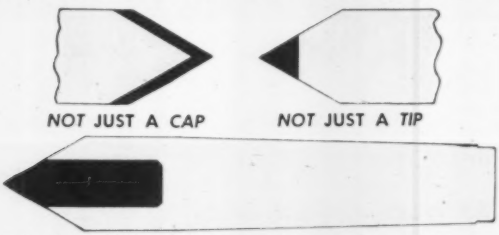

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LETTERS
TO THE EDITORS

Who Makes This Bounce?

In STEEL Oct. 1, p. 63, is a squib entitled "Step on It—and Bounce," referring to a composition for surfacing cement floors. Who makes this material?

J. W. Lawrence
Murray Mfg. Co.
Brooklyn, N. Y.

. . . is there someone who manufacturers this compound commercially?

Samuel E. Jackson, manager
Tubing Division, Armco Steel Corp.
Middletown, O.

. . . kindly advise source, data, etc., on this material.

D. M. Baker, purchasing agent
Day Brite Lighting Inc.
St. Louis

• *This product is made by the Crossfield Products Corp., 71 South Union St., Elizabeth, N. J. C. R. Watt, of this company, can supply you with complete information.*

Foreign Market for Carbon

We are seeking a market for 150,000 to 200,000 tons of high-quality carbon, found to be ideal for recarburizing in open hearth and electric steel furnaces. To do this, we need a list of iron and steel manufacturers outside the U. S. but not behind the iron curtain, with information on capacities and location.

H. R. Seykota, production sales manager
Portland Gas & Coke Co.
Portland, Oreg.

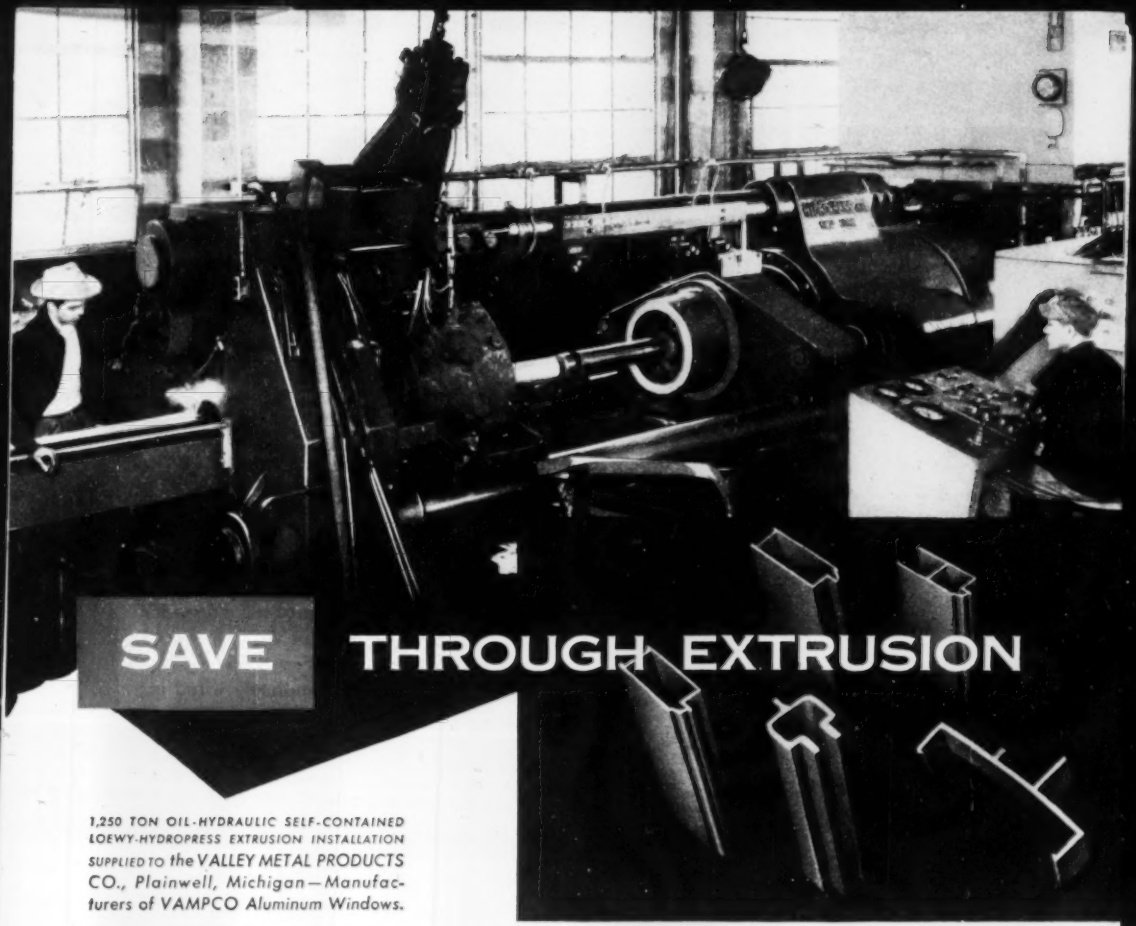
• *These manufacturers are included in "Ryland's Directory of Coal, Iron, Steel, Tinplate, Metal and Allied Trades", published by the "Iron and Coal Trade Review", 49 Wellington St., London W. C. 2.*

Whodunit?

In the "Production and Engineering News at a Glance" column of STEEL, July 30, p. 63, is an item dealing with a microphotography system producing 14,000 pages on an area equal to a postage stamp. You state that this development was made by a British scientist now in this country. Can you give us any additional information?

Kenneth Shaftan, director
Photographic Instrumentation Division
J. A. Maurer Inc.
Long Island City, N. Y.

• *Yes, sir! This microphotography system is the brain child of Gordon E. Elliott, a British scientist who recently joined United States Testing Co. Inc., 1415 Park Ave., Hoboken, N. J.*



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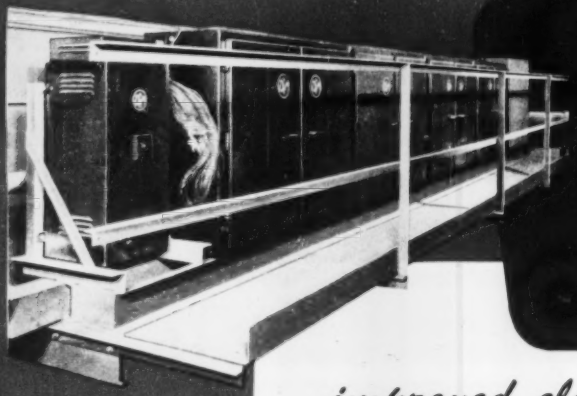

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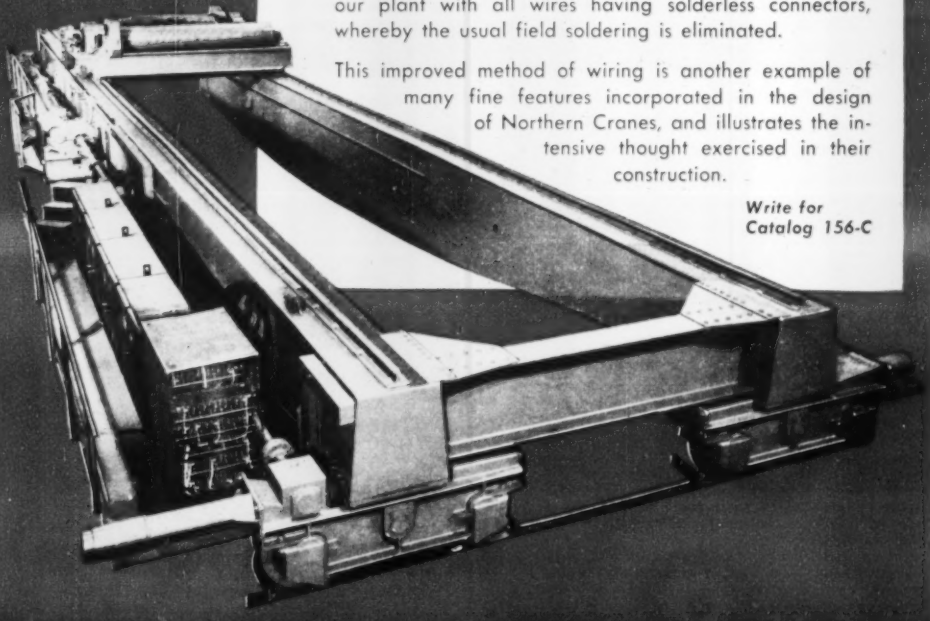
Write for Catalog 156-C



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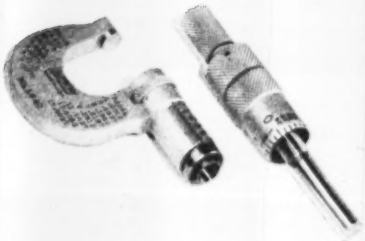

Warner & Swasey No. 11 Precision Tapping and Threading Machine in use at Lufkin Rule Company, Saginaw, Michigan.

THE NAME, LUFKIN, has long been associated with extreme accuracy by users of precision measuring instruments. However, many man-hours of selective assembly were required to assure such accuracy in Lufkin Micrometers—until Warner & Swasey helped simplify and speed up their production.

Now Warner & Swasey No. 11 Precision Tapping and Threading Machines tap the high precision threads necessary in the hub and in the thimble of the micrometer. They perform each of these tapping operations in one pass, where three were previously required. And Warner & Swasey's positive lead screw principle maintains an accurate and constant lead control in these threads. No longer must an operator "feel" his way into the work by hand, or risk damage to the finished threads on withdrawal.

But of particular importance to Lufkin, operators can now qualify the starting positions of the taps so the "zero" mark on the micrometer's thimble matches perfectly with the reading lines on the hub when assembled. This drastically reduces the time-consuming selective and individual fitting of thimble to hub formerly necessary.

Where your work requires extreme threading accuracy on a production scale, call in your nearest Warner & Swasey Field Representative. He'll explain the many unique features of the No. 11 Precision Tapping and Threading Machine, and show you how it can improve your tapping operations.

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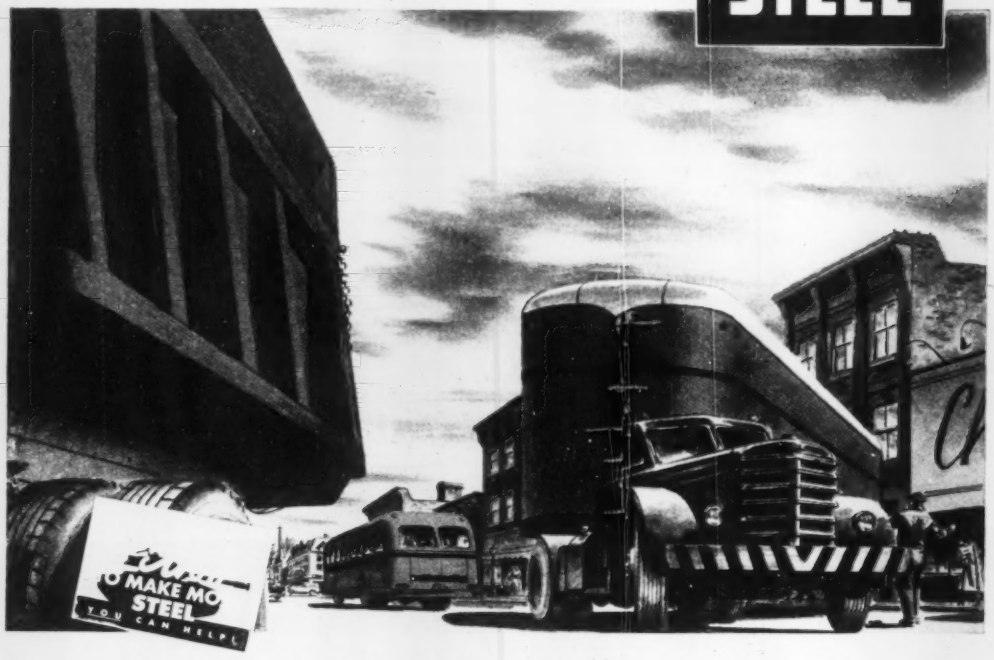

Operators and builders of transportation equipment are saving deadweight in structural parts with J&L Otiscoloy. The high tensile qualities of this special transportation steel permit weight reduction (as much as 35% in some cases) without loss of strength, because J&L Otiscoloy has twice the yield strength of ordinary mild steel.

By cutting deadweight through the use of Otiscoloy your equipment will be able to carry greater loads, and operate at a lower cost. This means increased income.

In addition, J & L Otiscoloy has these outstanding features that further help to lower maintenance costs—

1. **Otiscoloy has 4 to 6 times greater resistance to atmospheric corrosion than mild steel.**

2. **Otiscoloy has greater resistance to fatigue than mild steel.**

3. **Otiscoloy has substantially greater abrasion resistance than mild steel.**

4. **Otiscoloy is easily welded by any of the standard methods.**

5. **Otiscoloy can be readily cold formed.**

No wonder this modern transportation steel is used extensively throughout the industry in reducing deadweight and increasing service life.

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3 reports

On the new Steam Homo method for bluing

1 Solves cadmium shortage

The cadmium shortage caught a New England plant with its inventory down. At the suggestion of an L&N field engineer, they used a Steam Homo already in their heat-treat to blue some sample parts. Now, 80% of the parts that were previously cadmium plated on one of their products are blued. When cadmium is again available, they intend to stick with Steam Homo bluing. Close fitting parts operate smoother . . . costs are lower . . . and, they never have to worry about a steam shortage. Another Steam Homo is on order.

2 Eliminates hazards

A large manufacturer of tools didn't like the smell and hazards of the bluing method being used on die stocks and tap wrenches. After a demonstration, the firm switched to the Steam Homo Method. Now, operating people are happy . . . working conditions greatly improved. So many other uses for this versatile furnace have been found that now there are seven Steam Homos . . . with four more on order.

3 Better corrosion resistance

A large midwestern manufacturer tested several methods of bluing stators and rotors of electric motors. Parts were blued, and then placed in a humidity cabinet at 100% humidity and 110 F until red rust appeared. Steam Homo blued parts were still in good shape after three months. The other parts had rusted in less than half this time. Now that the Steam Homo Method is an integral part of their production set-up, their inspectors claim that color uniformity and general appearance are the best they've ever seen.

THESE are typical examples of the results plants all over the country are getting with the new Steam Homo Method for bluing. Durable, uniform, corrosion resistant and eye appealing, this type of finish can be applied to any iron or steel product.

Because steam is used as the furnace atmosphere, the process is clean, non-hazardous and inexpensive . . . the Steam Homo can be installed directly in production lines.

To find out what the Steam Homo Method can do for your product, get in touch with the nearest L&N office or write to 4957 Stenton Ave., Philadelphia 44, Pa.

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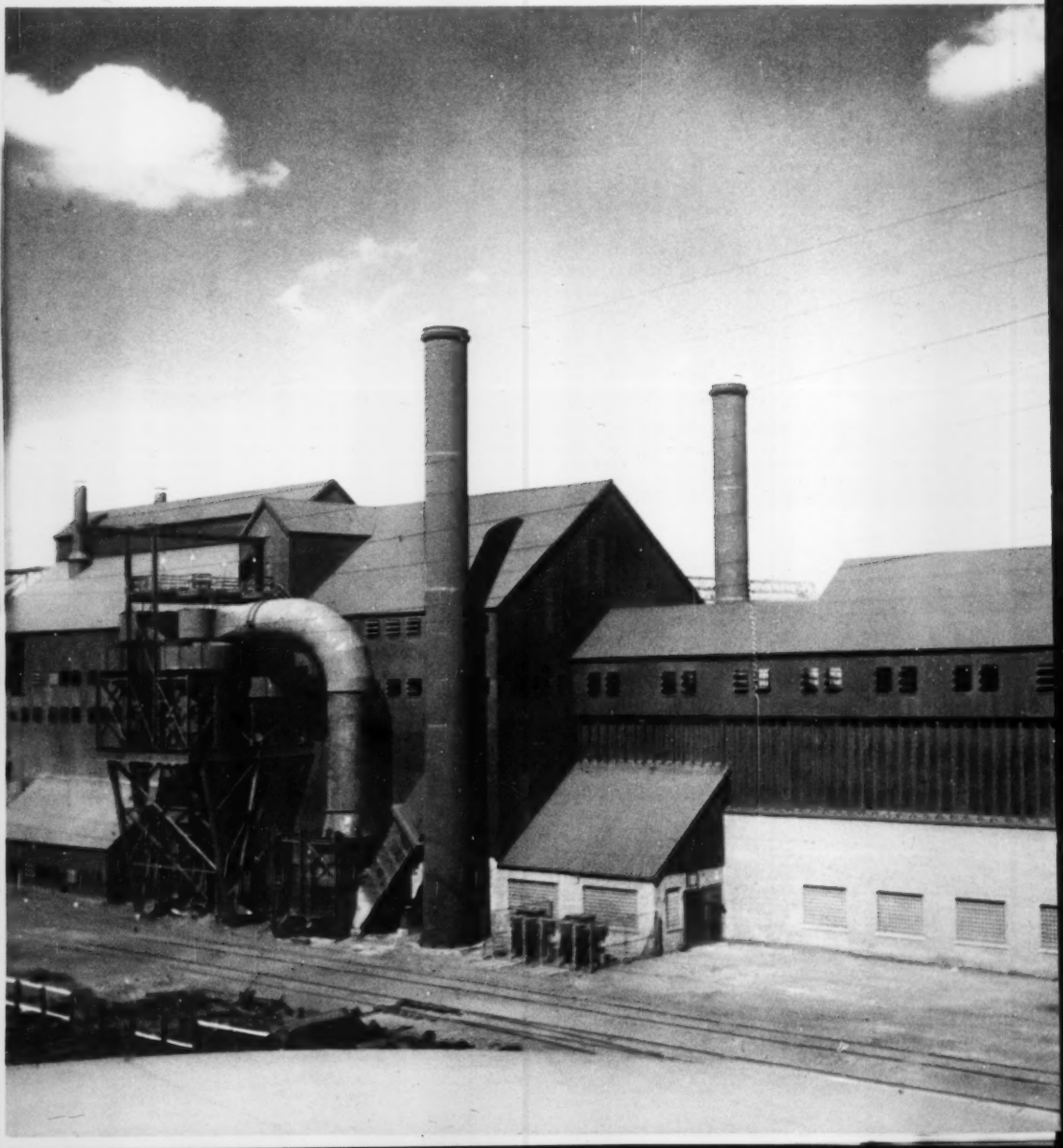
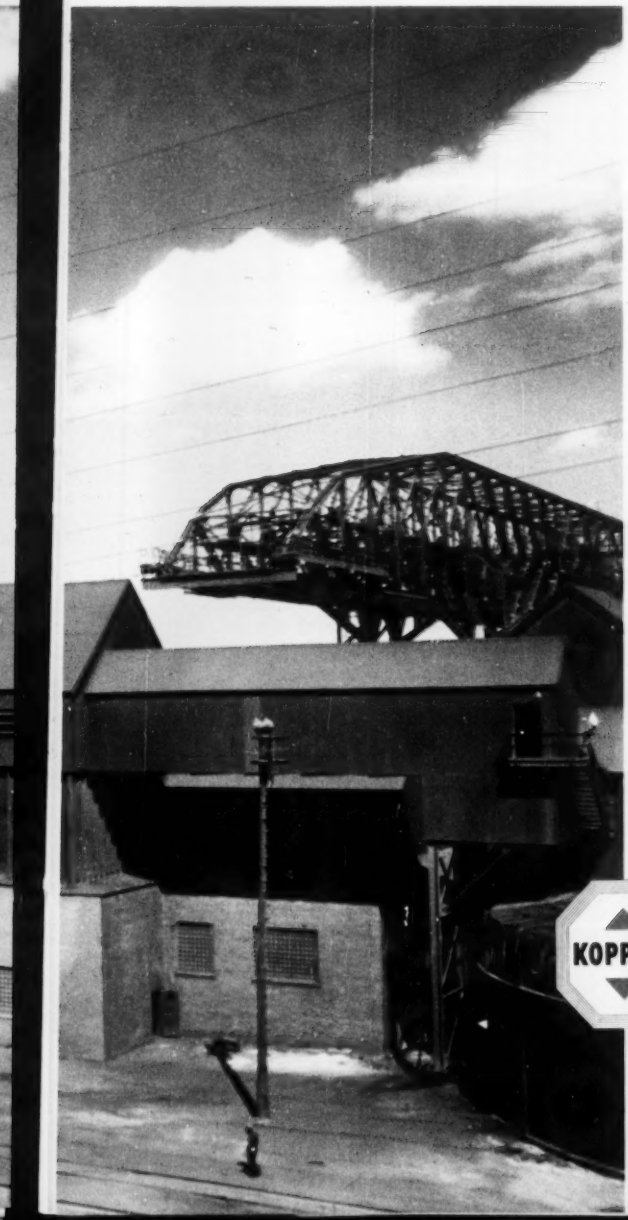


built for United States Steel

SINTER FOR BLAST FURNACES



OUR nation's steel mills are shattering all production records, trying to meet the terrific demands for steel. And, at the same time, every steel mill must squeeze the most out of every ton of iron ore. There's no place for waste in this critical period.

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The modern sintering plant, pictured here, was built in 1950 by our Freyn Engineering Department for the Gary, Indiana, Plant of the United States Steel Company. This Freyn-Design Plant has two sintering machines. Being extremely flexible in operation, this plant can use various percentages of iron-ore fines and flue dust in producing ferrous burden.

Constructing sintering plants is just one way in which Koppers serves the steel industry. For any kind of metallurgical construction, *you can count on Koppers.* You are invited to consult with our Engineers and Management.

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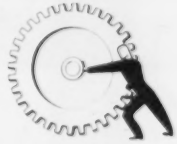

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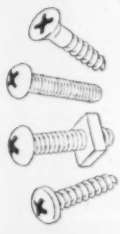

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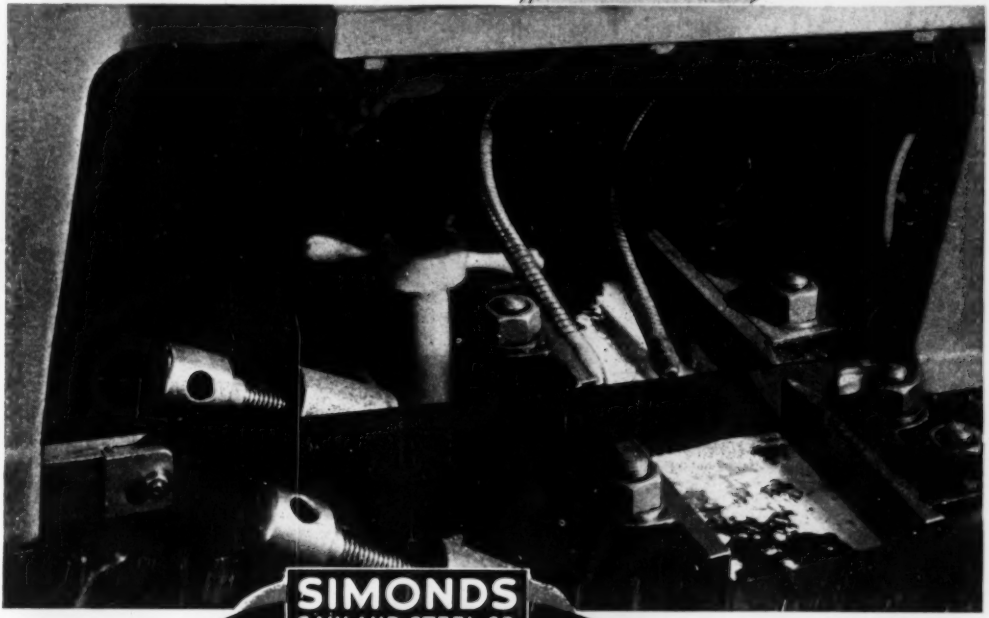

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ELECTROMET *Data Sheet*

A Digest of the Production, Properties, and Uses of Steels and Other Metals

Published by Electro Metallurgical Company, a Division of Union Carbide and Carbon Corporation, 30 East 42nd Street, New York 17, N. Y. • In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

New Foundry Alloy Neutralizes Effect Of Varying Section in Gray Cast Iron

Low-Carbon Foundry Ferrochrome is a new silicon-chromium alloy specially developed by ELECTROMET for the alloying of cast iron. It is so balanced in composition that it increases the strength and Brinell hardness of gray iron, as well as its resistance to wear and corrosion, without increasing the chilling tendency of the metal.

The alloy has a nominal analysis of 50 per cent chromium and 30 per cent silicon. It has excellent solubility in iron, and the inoculating effect of the silicon content makes it possible to add up to 1 per cent chromium to gray iron as a ladle addition, with no appreciable increase in chill depth. Light-section castings, such as automobile and truck exhaust manifolds and stove parts, may easily be produced in 1 per cent chromium iron by a simple ladle addition of the alloy to any base iron that would be suitable for casting the same parts in unalloyed iron.

Effect on Chill Depth

Fig. 1 illustrates how chill depth was affected by varying additions of the new alloy to a commercial cupola iron analyzing 3.24 per cent carbon and 2.12 per cent silicon, with 0.12 per cent residual chromium. A chill depth of approximately $\frac{1}{4}$ of an inch was obtained in all of these typical hatchet-type chill-test specimens.

Effect on Mechanical Properties

Although Low-Carbon Foundry Ferrochrome was especially developed for decreasing the section sensitivity of gray iron castings, it is also useful in obtaining moderate increases in the strength of gray iron, when used alone or in combination with the alloys nickel, molybdenum, or vanadium. An unalloyed base iron, analyzing 3.43 per cent carbon and 1.95 per cent silicon, was treated with additions of 0.36 per cent and 0.84 per cent chromium. The following table gives the complete analyses of the irons. It shows how both Brinell hardness and tensile strength were improved by the alloying additions.

Analyses	Brinell Hardness	Tensile Strength
3.43% total carbon, 1.95% Si, 0.05% Cr.	202	31,000
3.41% total carbon, 2.20% Si, 0.36% Cr.	217	35,400
3.32% total carbon, 2.56% Si, 0.84% Cr.	228	36,100

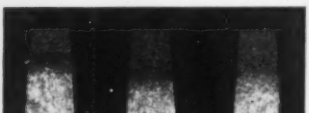

Fig. 1. These fractures of broken chill specimens show the effect on chill of chromium additions made with Low-Carbon Foundry Ferrochrome.

Auto Cylinder Castings

Addition of chromium to cast iron in the form of Low-Carbon Foundry Ferrochrome tends to stabilize the pearlitic structure of the iron, and to eliminate areas of soft secondary ferrite in slowly cooled sections. Moreover, the alloy helps avoid difficulties with chilled corners or edges in thin sections. It is therefore particularly well suited for producing a cylinder-type iron with consistently good structure and improved uniformity of hardness in sections exposed to widely varying cooling rates.

An example of the usefulness of this alloy is illustrated in Fig. 2, which shows strips cut from the bores of three automotive cylinder blocks. The base iron used in these castings was a typical unalloyed cylinder grade of cast iron, analyzing 3.38 per cent total carbon, 2.07 per cent silicon, and 0.08 per cent residual chromium.

The design of these castings was such that a heavy boss close to the cylinder bore caused slow cooling along one side, resulting in a soft area and wide variation in hardness along the length and around the perimeter of the unalloyed cylinder.

The strips illustrated in Fig. 2 were cut from the soft side of the cylinder bore. When subjected to a Rockwell B hardness exploration, casting No. 1 showed a variation in hardness from 92.2 to 80.2 Rockwell B (196 to 150 Brinell*). Casting No. 2 showed a variation from 94.0 to 90.8 Rockwell B (205 to 189 Brinell). Casting No. 3 showed a variation from 95.5 to 90.3 Rockwell B (213 to 187 Brinell).

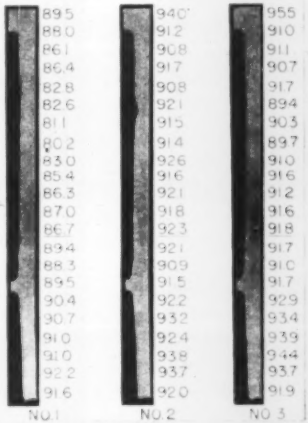

Fig. 2. Average Rockwell B hardness values at indicated positions in strip specimens from the bores of three cylinder block castings. No. 1-Untreated base iron containing 0.08% chromium. No. 2-Treated with 0.31% chromium added as Low-Carbon Foundry Ferrochrome. No. 3-Treated with 0.44% chromium added as Low-Carbon Foundry Ferrochrome.

The small chromium additions made in cylinders Nos. 2 and 3 had a marked effect in reducing the hardness spread and also in stabilizing the desired pearlitic structure in critical areas of the cylinder bore. This provided satisfactory resistance to wear in spite of difficulties introduced by an admittedly difficult design. Similar problems exist in most iron foundries—problems that Low-Carbon Foundry Ferrochrome can help solve with a minimum change in melting practice and at a very reasonable cost.

Booklets Available

Further information about this new ferrochrome is given in the booklets, "New Chromium Alloy Neutralizes Effect of Varying Cooling Rate in Gray Iron" and "Silicon-Chromium Alloy in Complicated Iron Castings." You may obtain copies, free of charge, by writing or phoning to the nearest ELECTROMET office: in Birmingham, Chicago, Cleveland, Detroit, Los Angeles, New York, Pittsburgh, or San Francisco. In Canada: Welland, Ontario.

*All Brinell hardness values were obtained by conversion from Rockwell B.

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HIGH-LIFT PLATFORM WORKSAVER

YALE WORKSAVER Electric Hydraulic Lift Trucks are built for loads up to 6,000 lbs., and are ideally designed to accommodate skids or pallets. Their wide acceptance throughout industry is based on the YALE reputation for top performance in electric trucks of *every* kind.

GET AN EYE-OPENING DEMONSTRATION RIGHT IN YOUR OWN PLANT OR WAREHOUSE

Your YALE Representative will demonstrate the cost-cutting advantages of the rugged WORKSAVER line to you. All you have to do is name the time and place. Naturally, there is no obligation.

Be sure to ask about the famous WORKSAVER "package"—*truck, battery, battery charger.* The YALE Selenium Charger saves time by charging WORKSAVERS right on the job.

YALE is a registered trade mark of The Yale & Towne Manufacturing Co.

There's a Yale Worksaver to meet your every need

YALE & TOWNE

MAIL THIS COUPON TODAY

The Yale & Towne Manufacturing Co., Dept. 811
Roosevelt Blvd. & Haldeman Ave., Philadelphia 15, Pa.

Cutting costs with YALE WORKSAVERS interests me, too.

☐ Please have your local Representative call on me.
☐ Please send me a free copy of the new WORKSAVER Catalog.

Name ..... Title .....

Company .....

Street ..... City ..... State .....

In Canada write The Yale & Towne Manufacturing Co., St. Catharines, Ont.

YALE GAS AND ELECTRIC INDUSTRIAL TRUCKS • YALE HAND TRUCKS • YALE HAND AND ELECTRIC HOISTS

STERLING RESEA
THIS FINEST

THE STERLING GRINDING

RCH OFFERS YOU BILLET GRINDING WHEEL

NEW CONCEPTIONS, BUILT TO PRE-DETERMINED STANDARDS, HAVE CREATED A "WHEEL OF INDUSTRY" THAT GUARANTEES FASTER, ECONOMICAL PRODUCTION

Sterling technicians started research on this new billet grinding wheel as if none had ever been made before. It was exactly like an assignment to a new project. As a result, it is now possible to offer you a NEW wheel with a special Sterling grit, available in grain combinations to create an abrasive unit that is tailor-made to your particular job demands.

Once these new billet grinding wheels are in use in your department, a production check will quickly indicate their superiority . . . their unusual ability to remove more metal at much less cost per pound. It is this easy metal removal that makes these wheels especially popular with workers. There is a very low fatigue factor whenever they are on the job.

In spite of their premium production and attractive economy, these better billet grinding wheels cost you no more. Our engineers will gladly consult with you and arrange a test on any job you designate to prove their better performance. There is no obligation. Write us today for quick service.

BEST IN THE TEST --- THAT'S STERLING

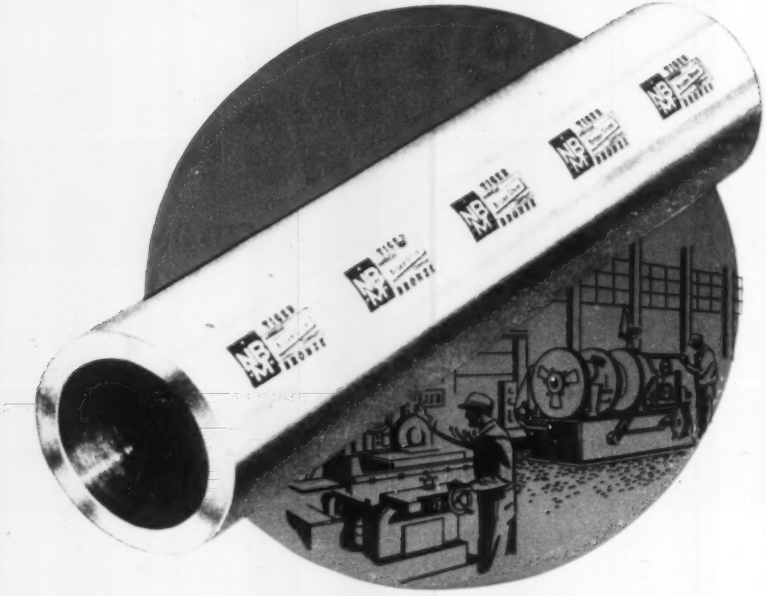
A test was recently conducted on Sterling's New Billet Grinding Wheel in the plant of a leading steel producer, who has used the "Wheels of Industry" for more than a decade. These modern abrasive units came out first--as usual.

In other well known steel mills, similar competitive tests have resulted in our 24x3x12 wheels leading all other types investigated. To be certain of superior production, use Sterling Grinding Wheels . . . always!

Ask for These STERLING Research and Development Folders - - -

These folders provide various specifications for grinding different types of tools and metals, as well as complete descriptions of new Sterling Research and Development features. Valuable suggestions for applying grinding techniques are suggested. Write today for your copies which will be sent you immediately.

WHEEL DIVISION TIFFIN OHIO



Saved:

35% on Bronze Bar Stock!

How a machine shop saved 30¢ per pound through direct shipments of N-B-M "Tiger" Bronze Bars.

If you use bronze bar stock—and are looking for a quick way to reduce maintenance or production costs—you'll be interested in how a Michigan Machine Shop saved $700 in one year on bronze purchases alone!

They formerly bought finished bronze bar stock locally—but about a year ago started ordering "Tiger" Bronze direct from National Bearing Division.

Result? **Their cost was immediately cut 30¢ per pound . . . thanks to direct-shipments. And equally important, these direct shipments are made overnight from one of our strategically located warehouses!**

This low price of N-B-M "Tiger" Bronze is made possible by these direct-to-you shipments . . . NOT by any sacrifice in quality. As a matter of fact, "Tiger" Bronze is highly anti-frictional to insure longer wear, and has physical properties that permit it to resist shocks, yet embed foreign particles.

13" lengths of "Tiger" Bronze are available in all popular sizes of machined or "as-cast" cored and solids, or "as-cast" hexagons . . . *available for prompt shipment of the bar size you want, when you want it.*

For longer—and lower cost—bearing service in your plant or product, try "Tiger" Bronze on your next order!

Write today for quotations and free catalog listing bar sizes, types, and "Tiger" Bronze alloy characteristics.

AMERICAN **Brake Shoe** COMPANY

NATIONAL BEARING DIVISION

4925 Manchester Avenue • St. Louis 10, Mo.

PLANTS IN: ST. LOUIS, MO. • MEADVILLE, PA. • NILES, OHIO • PORTSMOUTH, VA. • ST. PAUL, MINN. • CHICAGO, ILL.

WHY DO FORGEMEN LIKE THE NEW MAXIPRES?

Because NATIONAL has engineered *23 distinctly new forging press features* into the new MAXIPRES, including:

Disc Brake
Water-cooled, trouble-free.

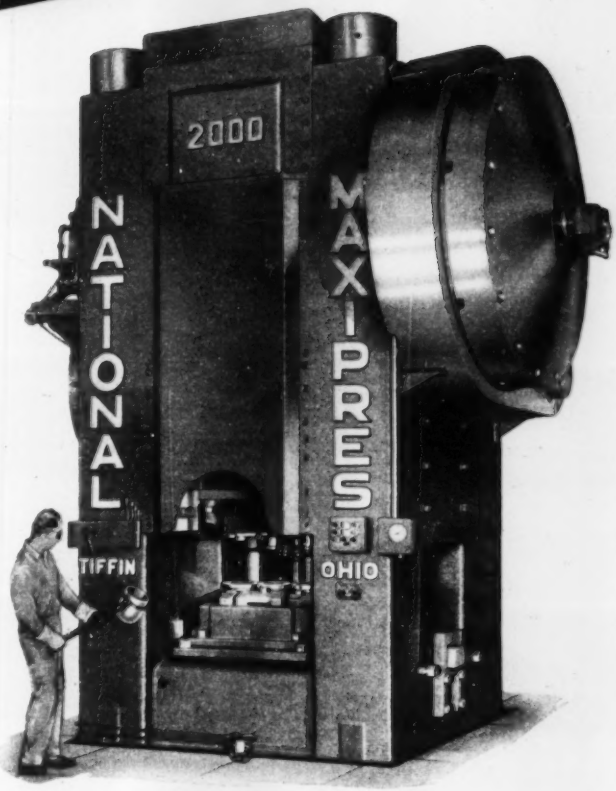
High-Capacity Clutch
Indestructible driving keys, 23% more ability.

Bigger Eccentric
Shaft strength 30% greater.

Tonnage Indicator
Blow-by-blow reading in tons.

Most modern forge shops have always preferred the MAXIPRES for its rugged construction and reliable operation, *plus* NATIONAL'S superiority in die design and service.

Now—the *new* MAXIPRES, *designed for the times*, is ready to fulfill the expanding requirements of the fast-moving forging industry.



MAXIPRESSES are available in 13 sizes from 300- to 8,000-ton.

NATIONAL
MACHINERY COMPANY
TIFFIN, OHIO.

DESIGNERS AND BUILDERS OF MODERN FORGING MACHINES—MAXIPRESSES—COLD HEADERS—AND BOLT, NUT, RIVET, AND WIRE NAIL MACHINERY

Hartford Detroit Chicago

These **dependable**

Bailey PRODUCTS

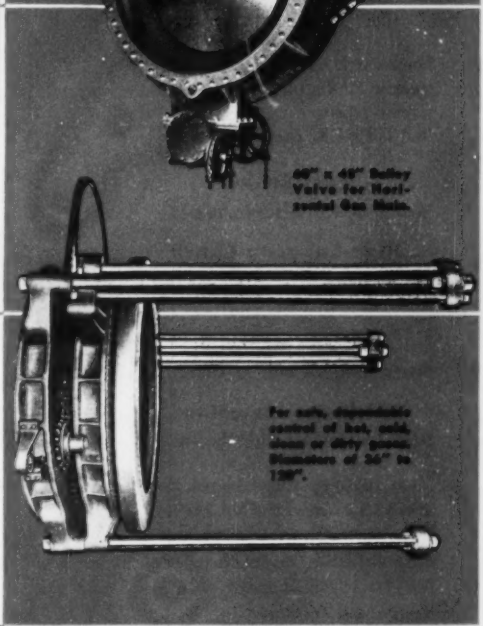
contribute to STEEL MILL SAFETY

60" x 48" Bailey Valve for Horizontal Gas Main.

Bailey

MECHANICAL VALVES

Noted for their dependable operation under all conditions, Bailey Mechanical Goggle Valves provide a tight, positive seal for shutting off gas mains in emergencies or for repairs. Requiring a minimum of maintenance, they operate by a powerful clamping force which is applied equally at all points around the disc periphery. Regardless of time between operations, they open or close instantly. Sizes from 6" to 72", totally enclosed if desired.



For safe, dependable control of hot, cold, clean or dirty gases. Diameters of 36" to 138".

Bailey

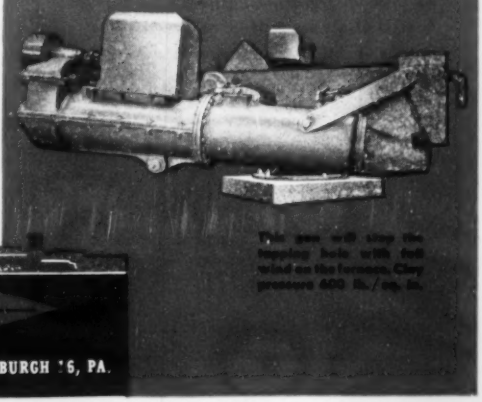
THERMAL VALVES

Operated by the lineal expansion and contraction of three sets of tubes spaced around a rigid steel flange, the Bailey Thermal Valve is always safe, dependable and *ready*. When steam is passed through the tubes, thermal expansion creates a powerful force that instantly frees the goggle plate and permits valve operation. When the steam is removed, contraction closes the flanges against the plate, forming a tight seal. Can be operated by hand in case of steam failure.

Bailey

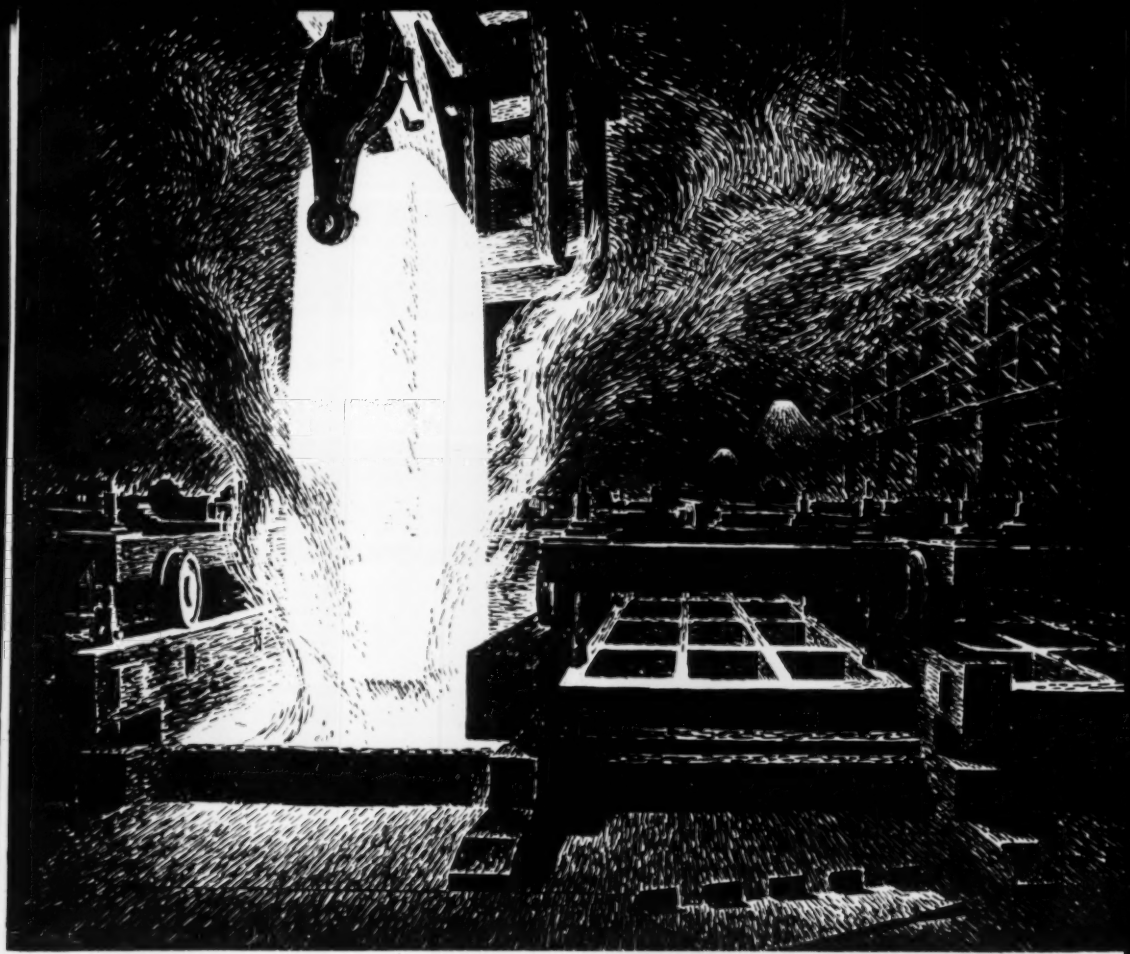
CLAY GUN

Powerful electric drive provides the piston pressure necessary to maintain long and uniform tapping holes. Special Bailey Lever Action forces the nose of the gun into position with positive accuracy. Piston is driven by an electric motor through reducing gears. The Bailey Clay Gun is dependable and safe.



This gun will stop the tapping hole with full wind on the furnace. Clay pressure 600 lb. / sq. in.

1221 BANKSVILLE ROAD PITTSBURGH 16, PA.



Drawing an Ingot

Scratchboard Drawing for Pittsburgh Steel Company by William Pendred

Progress in Steel

The glowing white-hot steel ingot being drawn from the soaking pit above is a symbol of progress at Pittsburgh Steel Company—a symbol that represents a fifty-percent increase in the company's steel making capacity.

This extra half-million tons of steel to be produced each year are the result of increased blast furnace capacity, enlarged open hearth furnaces and expanded reheating and rolling facilities that are a part of the Program of Progress at Pittsburgh Steel.

Thousands upon thousands of ingots like this one will be transformed from huge blocks of quality steel into blooms and slabs on the new giant blooming-slabbing mill and into a multitude of useful forms in various Pittsburgh finishing mills. They will be channeled into the Pittsburgh seamless tube mills and become oil country tubular goods, refinery still tubes, pressure tubes and mechanical tubing.

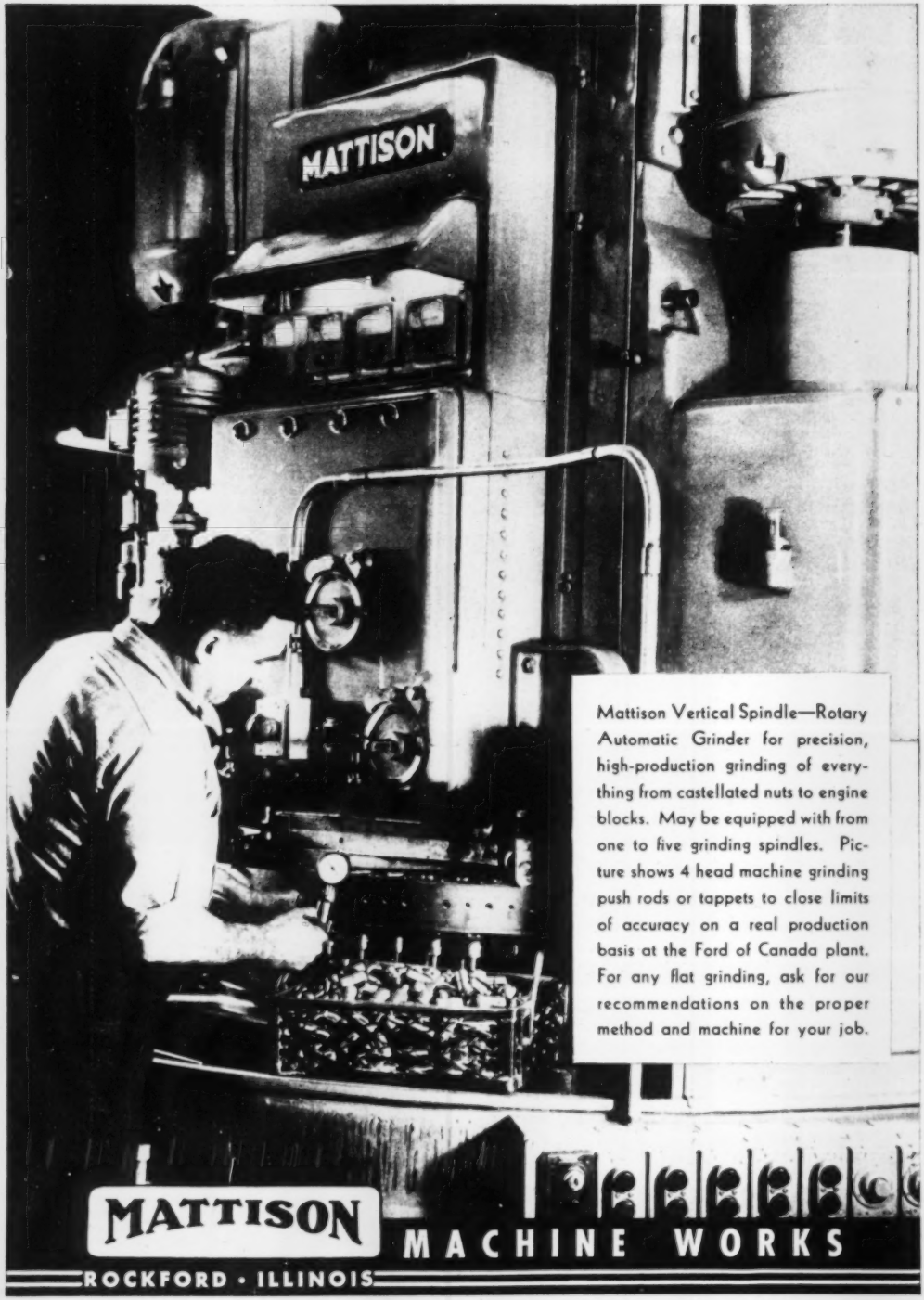
Other steel will be directed into the Pittsburgh wire mills and emerge as oil tempered spring wire, cold-heading wire, forming wire, nails, farm fence and chain link fence. Some of the wire will be made into Pittsburgh Steeltex for reinforcing plaster, masonry and stucco walls and concrete floors in residential and commercial construction.

Many of these ingots will be rolled into slabs to feed the new 66-inch continuous strip-sheet mill, which will be completed in 1952. This modern mill, which incorporates all of the new advancements for efficient operation, will increase the cold rolled strip production at the Thomas Strip Division and will supply the nation's metal working industry with hot rolled strip and sheets.

For all of this the ingot above represents even more—it is a symbol of the steel industry's united effort to produce steel in even greater quantities to help defend the free world from aggression and to adequately serve our growing civilian needs.

Pittsburgh Steel Company

Pittsburgh, Pennsylvania

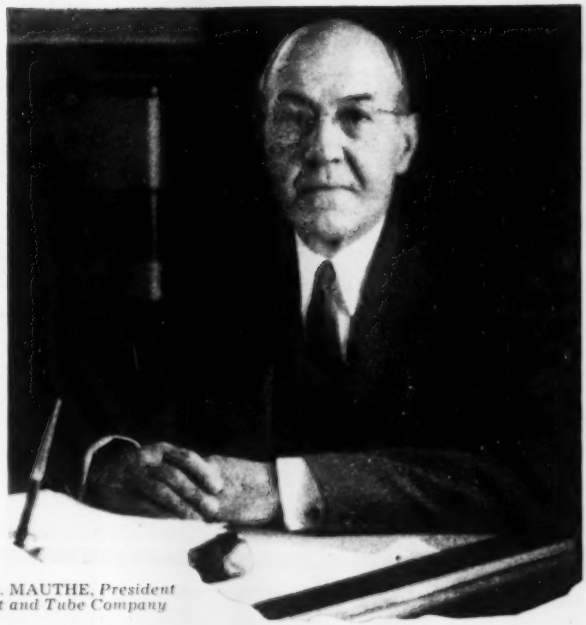


Mattison Vertical Spindle—Rotary Automatic Grinder for precision, high-production grinding of everything from castellated nuts to engine blocks. May be equipped with from one to five grinding spindles. Picture shows 4 head machine grinding push rods or tappets to close limits of accuracy on a real production basis at the Ford of Canada plant. For any flat grinding, ask for our recommendations on the proper method and machine for your job.

MATTISON MACHINE WORKS

ROCKFORD • ILLINOIS

Why is the **scrap** situation so **critical?**



An interview with J. L. MAUTHE, President
The Youngstown Sheet and Tube Company

Why are you concerned about iron and steel scrap, Mr. Mauthe?

Our inventories are critically low and the present scrap flow is not sufficient to maintain capacity steel plant operations. Furthermore, if the flow of scrap is not increased, a curtailment of steel production is inevitable.

The industry is using all the pig iron and all the home scrap that is available. The balance of our metallic requirements must be made up through procurement of purchased scrap. Every ton of scrap that we do not get represents a ton of steel that we cannot make.

How much scrap does the industry need?

In 1950, 96,700,000 tons of steel ingots and castings were produced, requiring over 61,000,000 tons of iron and steel scrap.

In 1951, over 65,000,000 tons of scrap will be required, and even more will be needed in 1952.

Where does scrap come from?

About 58% of the total scrap required is produced by the ingot and casting makers, and is known as "home" scrap; the balance of 42% is "purchased" scrap and is procured from outside sources.

Purchased scrap generally falls into two categories: Scrap from current fabrication and that which is the result of obsolescence.

There are three important sources from which we get obsolete scrap, much of which is dormant:-

1 - Obsolete machinery and equipment in every industrial plant, at the oil fields and on the farms.

2 - Battlefield scrap, obsolete ships and war material, surplus machinery and equipment, which government can make available.

3 - Countless old automobiles and trucks, which are rusting away in automobile wrecking yards in every section of the country.

What can be done to increase tonnage of purchased scrap?

This scrap must be made available immediately! All industry and government must awaken to the critical nature of the situation. They must realize that if we do not get the scrap, they will not get the steel!

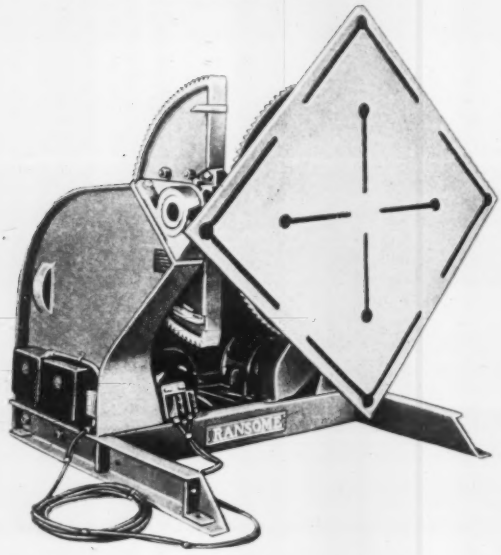
YOU CAN HELP - YOU MUST HELP!
NO SCRAP - NO STEEL

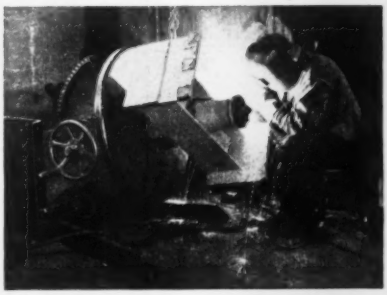
QUALITY V YOUNGSTOWN SERVICE

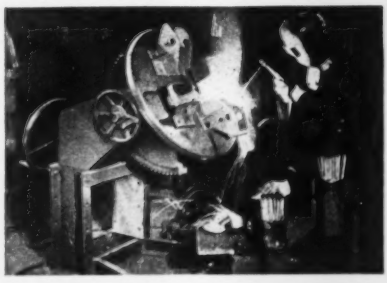
The Youngstown Sheet and Tube Company - Youngstown, Ohio

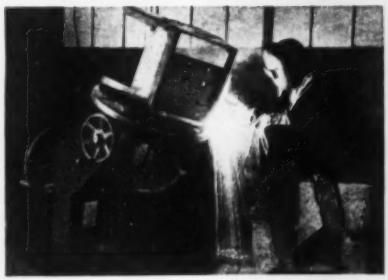
Lots of Different Pieces or Lots Alike...

THIS POSITIONER PAYS OFF









in more production . . . better welds . . . less rod waste

The universal table top makes the Worthington-Ransome Welding Positioner as profitable on *job* work as it is in mass production. Those "T" slots make the table adaptable to any shape of work piece and a wide range of sizes. No special jigs or fixtures needed.

Whether you produce "thousands alike" or "every one different", benefit from *increased arc-time* with Worthington-Ransome Welding Positioners. With just one set-up, the work is clamped to the table top. Then push-button controls or simple hand cranks do the work of tilting or rotating into any position convenient for economical downhand welding. Your welder can continuously weld without costly time and labor wasted in frequent rehandling of the work.

Result—up to 50% more footage, *better* welds (using higher current and heavier rods), less welding rod waste.

Welding positioner capacities from 100 lb to 30 tons. Also: turning rolls from 3 to 150 tons, stationary or self-propelled.

Write Worthington Pump and Machinery Corporation, Dunellen, New Jersey, for bulletins or additional information.

WORTHINGTON

Y.1.2

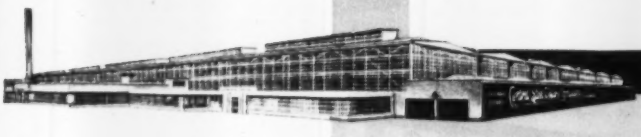
CENTRAL STEEL
AND WIRE COMPANY

Your Call Brings Fast, Dependable Delivery Anywhere in the Middle-West

With our cut-to-order service, order-filling, loading and delivery facilities geared to meet the expanding requirements under mobilization, a steady stream of materials is flowing out of our four strategically located warehouses to industrial plants all over the Middle-West.

Right now, when time is of the essence, this fast, dependable service may be important to you in keeping your production line moving or in meeting finished work schedules.

Regardless of your requirements for Carbon, Stainless or Alloy Steels, Brass, Copper and Aluminum, call Central Steel *first*—we will welcome an opportunity to serve you.



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Carbon & Alloy • Stainless
Copper • Brass • Aluminum
Expanded Metal • Structurals

All materials are available at published prices

Central Steel & Wire Company

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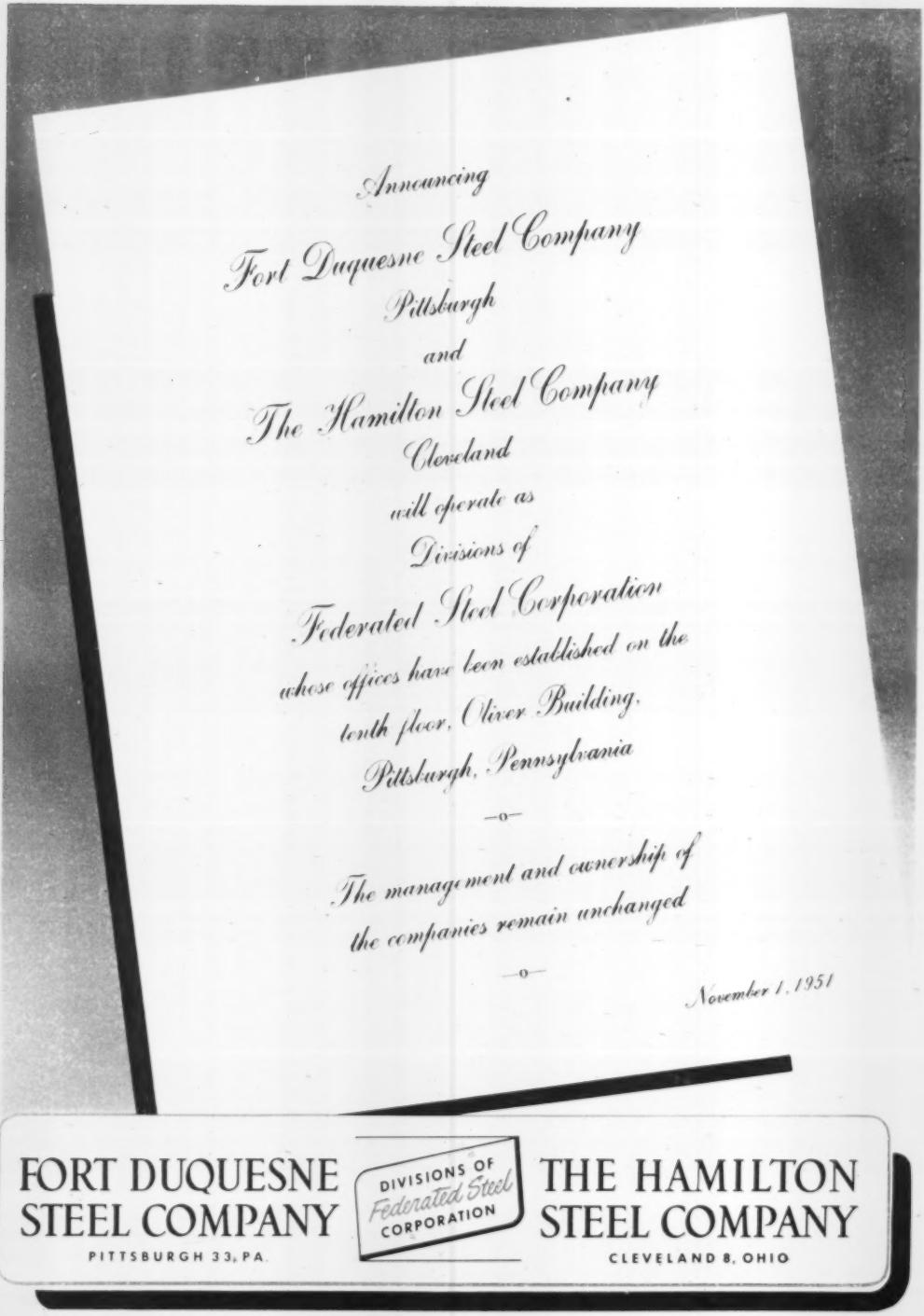
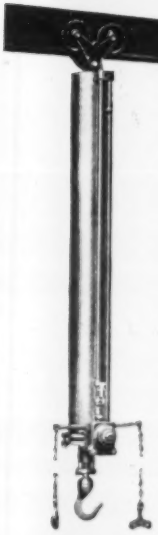
P. O. Box 5310-A	13400 Mt. Elliott Ave.	Box 148 Annex Sta.	6623 W. Mitchell St.
REpublic 7-3000	TWinbrook 2-3200	AVon 2230	EVergreen 4-7400

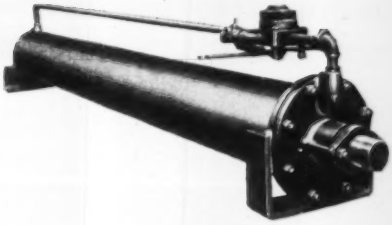


FORT DUQUESNE STEEL COMPANY
PITTSBURGH 33, PA.

DIVISIONS OF Federated Steel CORPORATION

THE HAMILTON STEEL COMPANY
CLEVELAND 8, OHIO





VERTICAL *All Steel*
HOISTS

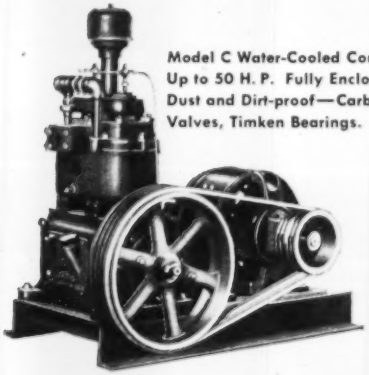
HORIZONTAL *All Steel*
CYLINDERS

Do You Have a
PULLING
PUSHING
LIFTING
or LOWERING
PROBLEM?

•

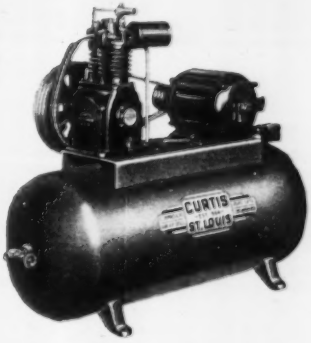
—For low-cost handling of materials, machines or component parts

Choose a **CURTIS AIR COMPRESSOR**
FOR INDUSTRIAL APPLICATION



Model C Water-Cooled Compressor, Up to 50 H. P. Fully Enclosed—Dust and Dirt-proof—Carbon-Free Valves, Timken Bearings.

Curtis Model F Air Compressor, Up to 10 H. P., Portable or Stationary.



All Curtis equipment is precision made from top quality raw materials.

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CURTIS PNEUMATIC MACHINERY DIVISION of Curtis Manufacturing Co.
1996 Kienlen Avenue, St. Louis 20, Mo.

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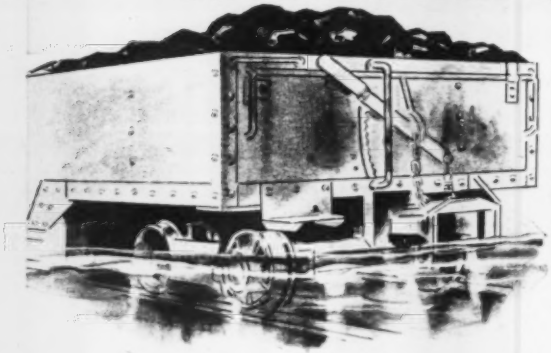
WHEELS AND AXLES OF MINE CARS UNDER WATER FOR THREE WEEKS



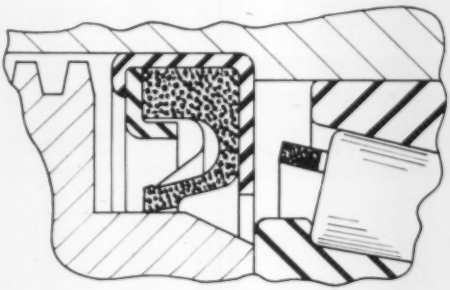
But Garlock KLOZURES Protected the Bearings

—Kept them absolutely dry and clean!

In 1948 a large coal company in Virginia installed Garlock KLOZURE Oil Seals on the anti-friction bearings of 200 of its mine cars. For the past three years these cars have been operating under severe conditions with plenty of water and abrasives present, which is a common mine condition.

During a mine shut-down these cars stood in water for three weeks with the wheels and axles completely submerged. A subsequent inspection showed that all bearings were free of rust, dirt and water. The KLOZURES and complete bearing assembly were in A-1 condition with no wear evident. These oil seals really had done a job!

This is just one more instance of the kind of bearing protection you may expect when you use Garlock KLOZURES.



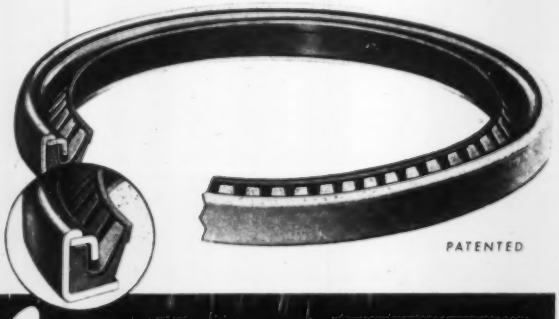
Application of Garlock KLOZURE to mine car wheel assembly.

Write for our KLOZURE *catalog.*

THE GARLOCK PACKING COMPANY
PALMYRA, NEW YORK

In Canada: The Garlock Packing Company of Canada Ltd., Toronto, Ont.

Model 53 KLOZURE—an efficient, general purpose seal for high speeds. The serrated, finger-type spring is clog-proof—no danger of trapping abrasives.



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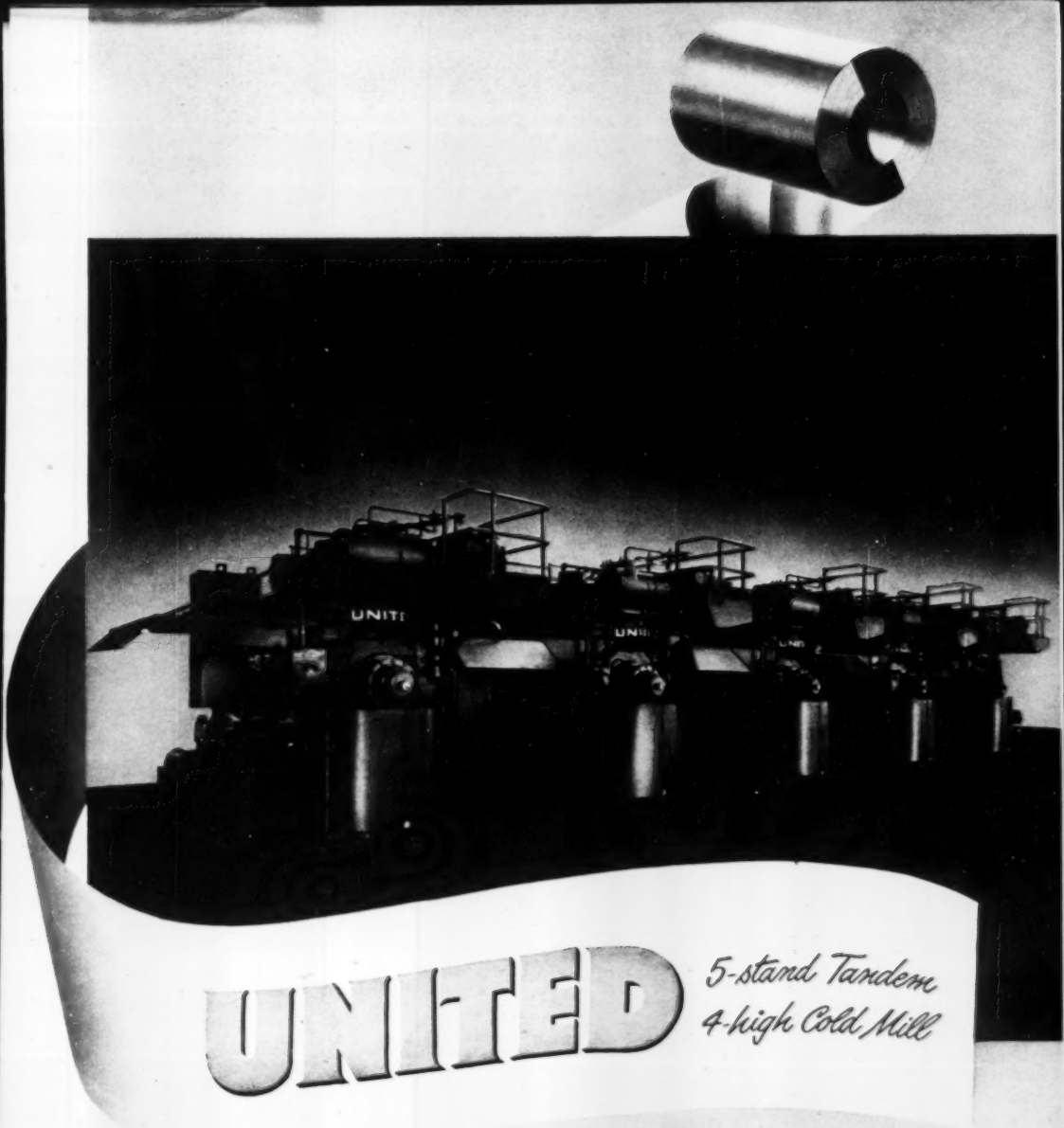
GARLOCK *Klozure** OIL SEAL

*REG. U. S. PAT. OFF.



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UNITED ENGINEERING AND FOUNDRY COMPANY

Pittsburgh, Pennsylvania

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Amid the crashing of forest giants and the chug-chug of burdened tractors, you'll find McKay Chains at work lifting, hauling, holding, rigging and otherwise helping lumbermen move their products to the markets of the world.

McKay Chains have proved themselves in performance, economy and long service life under all work conditions. In every industry, as in lumbering, "There is a McKay Chain for Every Use." No job is too big, none too small.

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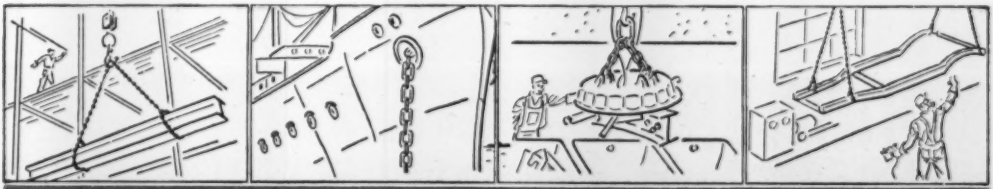
McKAY CHAIN *for Every Use*

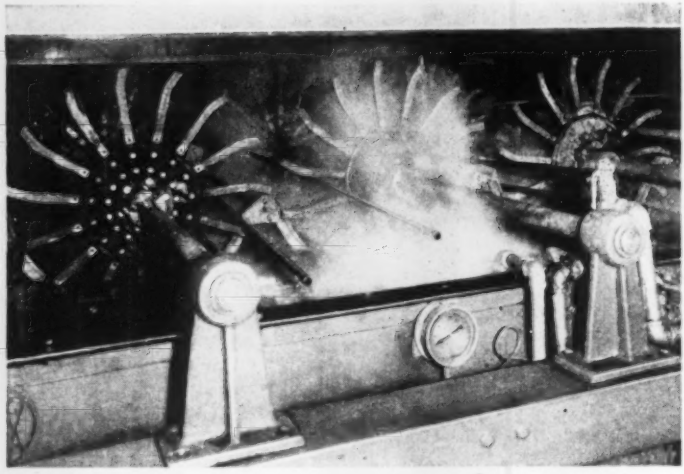
McKAY—A GOOD NAME FOR GOOD CHAIN—SINCE 1881



The McKAY Company • 446 McKay Building • Pittsburgh 22, Pennsylvania

These HASTELLOY Alloy Paddles

TRADE-MARK



COMBAT HOT H_2SO_4 and AERATION

Three pairs of HASTELLOY alloy C paddles have been carrying mild steel tubing in and out of a pickling bath for more than a year . . . and still show no measurable loss in cross section. The paddles stay in the solution—10 per cent sulphuric acid at 165 deg. F.—for 30 seconds, and are then exposed to the air for 30 seconds before they go back in the solution again. In addition to aeration and the hot acid, they are subjected to abrasion and impact. Other materials tested on this same job failed after less than three months.

HASTELLOY nickel-base alloys are being used more and more for the construction of pickling equipment because of their high strength and their resistance to aeration and the corrosive effects of the common mineral acids. For the case history of another successful application of these alloys in pickling operations, write for the booklet, "Pickling Equipment for Severe Corrosive Conditions."

COMPARATIVE LIFE DATA

HASTELLOY Alloy	Over 1 YEAR
Other Materials	Less Than 3 MONTHS

HAYNES alloys

TRADE-MARK

Haynes Stellite Company
A Division of
Union Carbide and Carbon Corporation
UCC
General Offices and Works, Kokomo, Indiana
Sales Offices
Chicago — Cleveland — Detroit — Houston
Los Angeles — New York — San Francisco — Tulsa

"Haynes" and "Hastelloy" are trade-marks of Union Carbide and Carbon Corporation.

WE'VE CUT YOUR THREADING COSTS—

On Government Orders Like These

Threading tools, times, and tolerances for a long list of parts included in the current government procurement program are ready for you here at Threading Headquarters—the home of Namco Vers-O-Tools.

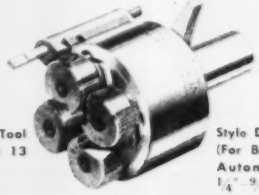
Our engineers have proved these recommendations in production—and our customers are re-proving them in terms of *profit*. They've found that the basic design and construction advantages of the Vers-O-Tool really do pay off.

Take the matter of accuracy: Ground-thread-form circular chasers insure close tolerances and fine finish for the life of the chaser—regrindable through a full 270°. And on some jobs you'll get as many as 100,000 parts between grinds. Direct micrometer check of accuracy after each regrind safeguards sustained production on long runs.

These and many other exclusive Vers-O-Tool features give you a definite competitive edge in bidding on government work. Find out more about them in our catalog D-51. And for specific recommendations on a particular government job, send print or write us direct.

Style DS Vers-O-Tool (Nonrevolving Type) 9 sizes, $\frac{3}{8}$"–4$\frac{7}{8}$".

Style DR Vers-O-Tool (Revolving Type) 13 sizes, $\frac{3}{16}$"–4$\frac{7}{8}$".



Style DBS Vers-O-Tool (For Brown & Sharpe Automatics) 3 sizes, $\frac{1}{4}$"–$\frac{9}{16}$".

The NATIONAL ACME CO.

170 EAST 131st STREET • CLEVELAND 8, OHIO

Acme-Gridley 4-6 and 8 Spindle Bar and Chucking Automatics • Single Spindle Automatics • Hydraulic Thread Rolling Machines • Automatic Threading Dies and Taps • The Chronolog • Limit, Motor Starter and Control Station Switches • Solenoids Centrifuges • Contract Manufacturing

Here's how YOU can help to SPREAD THE SUPPLY OF STAINLESS STEEL

1 Let us know ALL the conditions of use.

2 Tell us what fabricating methods you'll employ.

3 Tell us when you will actually NEED the material in the shop.

4 Give us a choice of multiple sizes that will cut with minimum scrap loss and wastage.

5 Hurry your working scrap back to the mill.

ALL stainless producers are in the same boat. We have the capacity to melt much more stainless steel if we could get more alloying materials. So, our first concern—with your help—is to make as much stainless as possible from the alloys allotted to us.

For example, suppose that 18-8 Allegheny Metal (18% chromium, 8% nickel) is ordered for a job where a 17% straight chromium grade would actually satisfy the conditions of use and the fabricating methods employed. In effect, 1% of chromium and the 8% of nickel would be wasted—could have been used to make more stainless steel. That's where Points 1 and 2 above come in.

Our next concern, after selecting the right steel for the job, is to make sure it is used right—with the least amount of wastage in conversion or fabrication, and the least amount lying idle in stock or scrap. That's where Points 3, 4 and 5 come in.

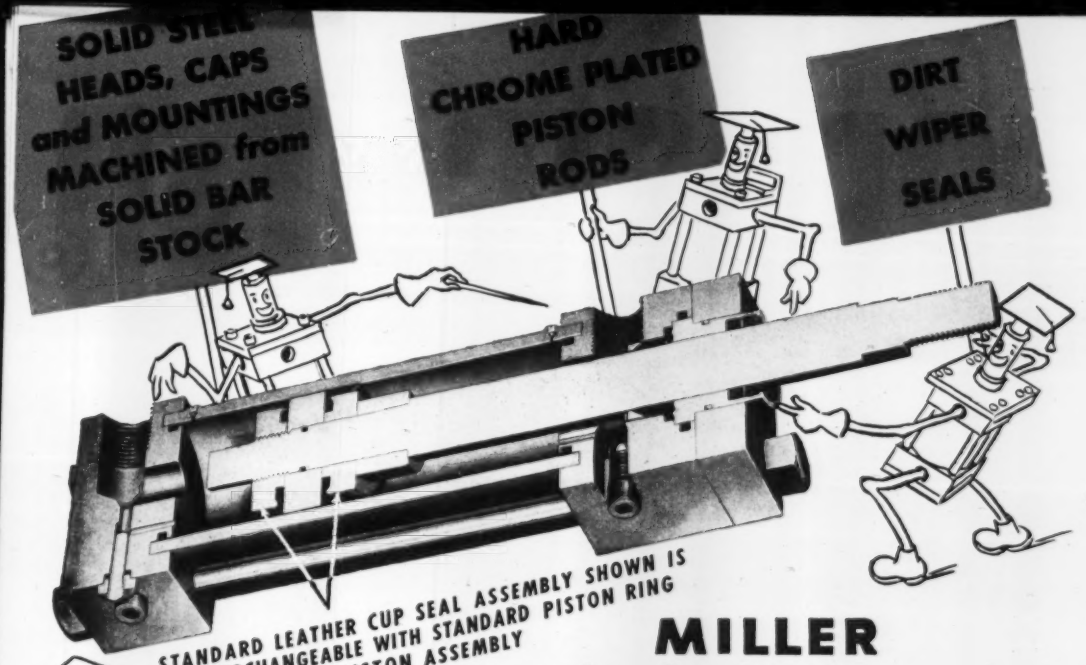
Help us to make this conservation program work, to help *you* get the stainless steel you need. ● *For any assistance, printed or personal, address Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.*

You can make it **BETTER** with

Allegheny Metal

AL TIME-TESTED STAINLESS STEEL

W&D 3693



STANDARD LEATHER CUP SEAL ASSEMBLY SHOWN IS INTERCHANGEABLE WITH STANDARD PISTON RING PISTON ASSEMBLY

MILLER *High Pressure* HYDRAULIC CYLINDERS

Meet J. I. C. HYDRAULIC STANDARDS

(Write for FREE copy of these "Standards")

Years before the Joint Industry Conference (J. I. C.) Standards for specifying "quality" hydraulic equipment were adopted, the *standard* design and construction features of Miller High Pressure Hydraulic (2000-3500 psi) Cylinders already included ALL the specifications for cylinders, seals and pistons now called for by the "Standards". Hard chrome plated, scratch-resistant piston rods and dirt wipers have long been standard Miller cylinder features yet are required by the "Standards" only under severe conditions.

Solid steel heads, caps and mountings which eliminate costly, dangerous breakage even under the severest operating conditions represent an "extra-quality" standard Miller cylinder feature which actually exceeds the high quality set by the J. I. C. Standards.

The Miller "Patented" Hydraulic Piston Rod Seal which has no manual adjustment and is automatically self-adjusting and wear-compensating to give life-long leakproof service without ever requiring any manual adjustment whatsoever . . . far surpasses the requirement of J. I. C. Standard H6.2.5 which specifies "Stuffing boxes for automatic packing shall be so designed as to prevent adjustment beyond the functional limits of the packing"

Benefits to You

No Broken Castings

No Scratch-Damage to Piston Rods, Bushings and Seals

NO COSTLY "DOWNTIME"

NO REPAIRS

NO MAINTENANCE

NO POWER WASTAGE

Write for illustrated cylinder bulletins A-105 and H-104

COMPLETE MILLER CYLINDER LINE INCLUDES: AIR CYLINDERS, 1½" to 20" BORES, 200 PSI OPERATION; LOW PRESSURE HYDRAULIC CYLINDERS, 1½" TO 6" BORES FOR 500 PSI OPERATION, 8" TO 14" BORES FOR 250 PSI; HIGH PRESSURE HYDRAULIC CYLINDERS, 1½" TO 12" BORES, 2000-3000 PSI OPERATION. ALL MOUNTING STYLES AVAILABLE.

MILLER MOTOR COMPANY

2032 N. HAWTHORNE ------ MELROSE PARK, ILL.

AIR AND HYDRAULIC CYLINDERS · ACCUMULATORS · COUNTERBALANCE CYLINDERS · CONTROL VALVES

CLEVELAND — PITTSBURGH — PHILADELPHIA — DETROIT — YOUNGSTOWN — BOSTON
HARTFORD — NEW YORK CITY — DAYTON — ST. PAUL — FORT WAYNE — INDIANAPOLIS
MILWAUKEE — NASHVILLE — SEATTLE — LOS ANGELES — SAN FRANCISCO — BALTIMORE
ST. LOUIS and OTHER AREAS.

Sales and Service from coast to coast

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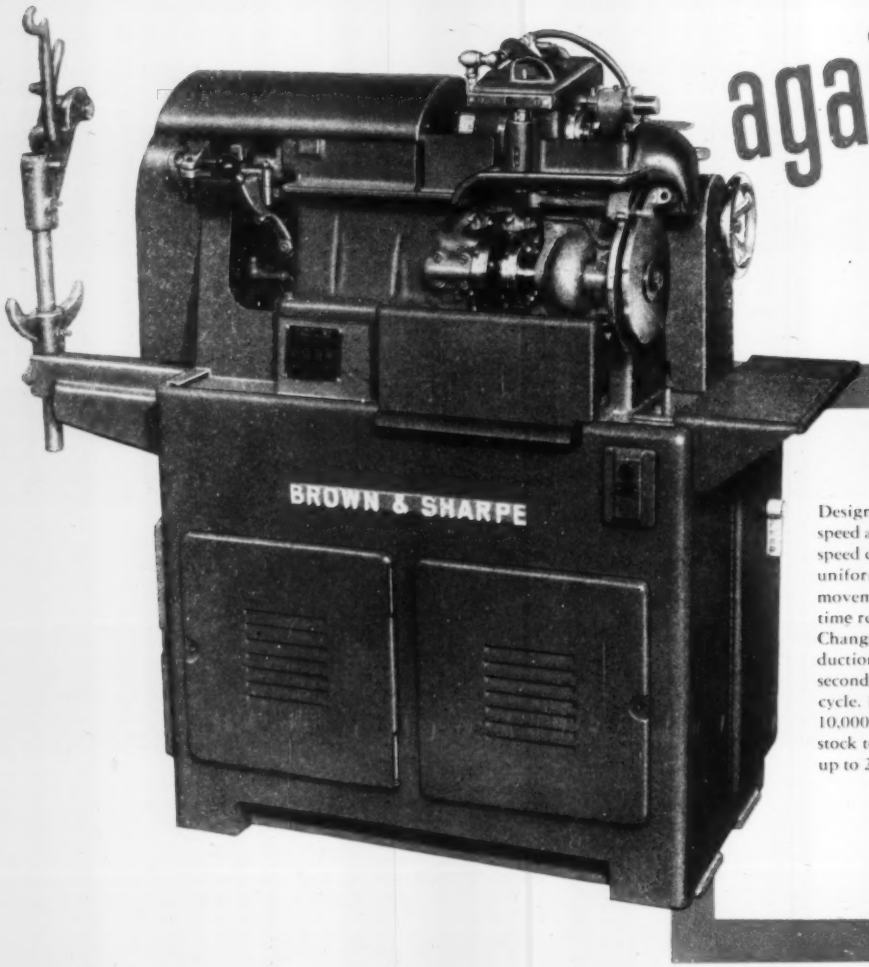
against

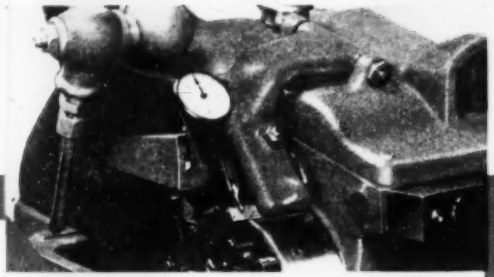


Designed throughout for speed and accuracy. Constant-speed drive shaft insures uniformly rapid automatic movements, regardless of time required to make part. Change gears provide production rates from 3 to 364 seconds for one piece per cycle. 16 spindle speeds from 10,000 to 910 r.p.m. Takes stock to 1/4" dia. and turns up to 2 3/8" length.

PROTECTION

Skilled-Operator Shortage...

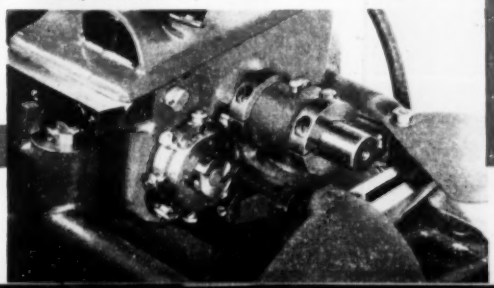
Brown & Sharpe
Automatic Pinion Turning Machine



Tool Adjusting Dial Indicator on swing-arm affords quick, accurate replacement of tool . . . saves time and cut-and-try spoilage.

Circular-Formed, Single-Point Tools are dressed by full-length surface grinding across the top . . . can be quickly and accurately resharpened.

Individual Micrometer Stops for each tool simplify accurate duplication of parts without machining cams to extremely close accuracy.



equips you for high output, accurate duplication . . . without expert pinion turning specialists!

With defense orders now adding to normal demands for staff and pinion work, the Brown & Sharpe Automatic Pinion Turning Machine represents one of the soundest investments many manufacturers can make.

This modern automatic single-point turning machine dependably meets all close-tolerances and fine-finish requirements of military and civilian assemblies such as clocks, instruments, fuses and timers. What's more, accurate operation with exceptionally high uniformity can be maintained without highly skilled operators!

Improved design features that make the Brown & Sharpe Automatic Pinion Turning Machine practically "foolproof" include: exclusive circular-formed single-point tools; built-in tool resetting indicator and tool centering gage; individual micrometer stops for all 8 tool positions; control of all operations by two simple disk cams.

Write for detailed specifications.
Brown & Sharpe Mfg. Co., Providence 1, R. I., U.S.A.

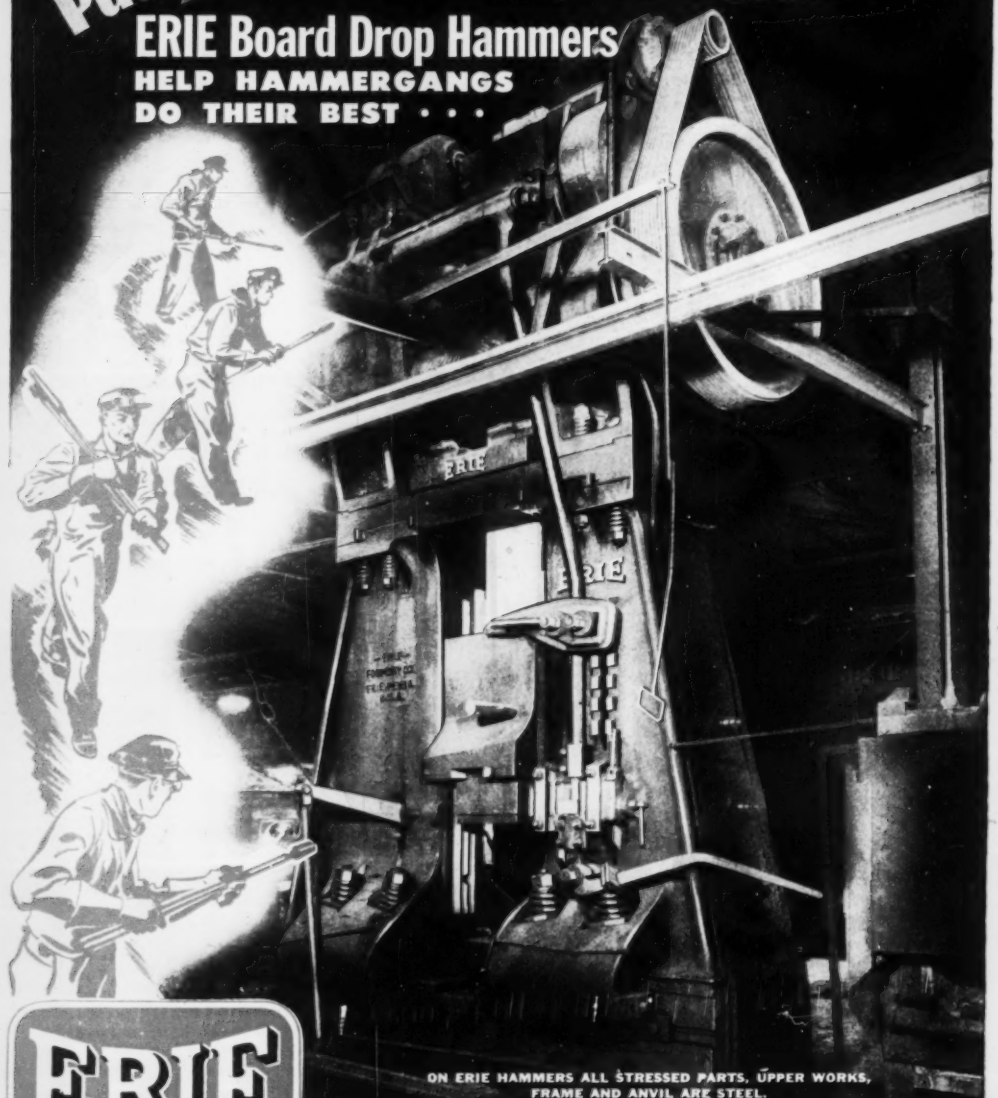
B·S

Brown & Sharpe

Put YOUR Men in this Picture....

ERIE Board Drop Hammers

HELP HAMMERGANGS DO THEIR BEST • • •



ERIE

WRITE FOR BULLETIN NO. 333

ON ERIE HAMMERS ALL STRESSED PARTS, UPPER WORKS, FRAME AND ANVIL ARE STEEL.

ERIE FOUNDRY COMPANY • ERIE, PA.

ERIE BUILDS *Dependable* HAMMERS

When they organized their salvage drive

DIAMOND ALKALI CHEMICALS

DIAMOND ALKALI more than doubled scrap shipments

WHY NOT GET CASH for your hidden scrap?

What firms like Diamond Alkali have done, your plant can do. All of us must dig deeper. As you know, it takes *one ton* of your old, obsolete and worn-out machinery, tools, dies, pipe and fittings, rails, chain, jigs, fixtures, rusted out tanks and boilers, to make *two tons* of new steel. The nation needs that steel, now. You need it. So, appoint a scrap collection team. Study all locations which are potential sources for scrap.

Sell it to your SCRAP DEALER

The procedure of returning scrap to the mills is far simpler than even the most elementary salvage program. Scrap commands an excellent price. So, turn it up and turn it over . . . to your scrap dealer for cash.

THIS 4-POINT PROGRAM GOT RESULTS:

● The Painesville, Ohio, plant of Diamond Alkali Company daily turns out hundreds of tons of alkali chemicals and allied products. When scrap metal shortages threatened, this producer put into effect a program which is channeling hundreds of tons of iron and steel scrap back to the mills.

Their successful program is based on planned *collections from four sources:*

1 **The continuous supply from plant maintenance, as machinists, pipefitters, ironworkers, and other craftsmen produce odds and ends in the regular performance of their work. This might be termed the "waste" from normal plant operations.**

2 **Scrap salvaged from the routine replacement of specialized equipment and materials of vital producing components.**

3 **Scrap salvaged as construction of new facilities, rehabilitation, and modernization goes on while the plant mobilizes to meet the need for greater alkali production.**

4 **Scrap salvaged from discontinued operations and from structures no longer used.**

Who did it? Naturally, many employees cooperated. The plant general manager designated the works engineer to head up the scrap collection program. He, in turn, appointed two plant engineering staff men to study locations which might be potential sources. Plant layout was studied to determine what could be scrapped, what could not. This "in-plant" team worked with the salvage department, already organized to handle routine scrap. An outside salvage firm was retained to dismantle an old bridge crane, other items. No possible supply of scrap metal has been overlooked.

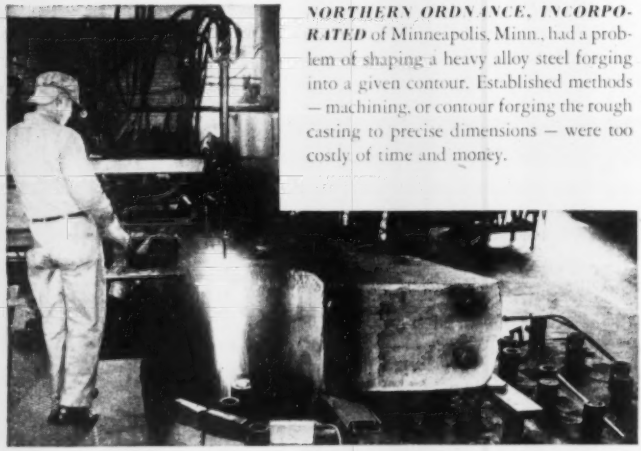
Results! By midyear, more scrap metal had come from the plant than ordinarily is shipped in a year's time. In one four week period alone, twelve full cars of scrap were started back to the hungry steel furnaces.

REPUBLIC STEEL

REPUBLIC STEEL CORPORATION

General Offices • Cleveland 1, Ohio

Shaping heavy forgings faster...at less cost with machine gas cutting



NORTHERN ORDNANCE, INCORPORATED of Minneapolis, Minn., had a problem of shaping a heavy alloy steel forging into a given contour. Established methods — machining, or contour forging the rough casting to precise dimensions — were too costly of time and money.

A. P. Demmer and R. F. Helmkamp. Airco Technical Sales Representatives, recommended oxyacetylene machine cutting the rough forging, using an Airco No. 6A Oxygraph.

Since the forging was about 70" long and 28" thick, weighing almost 7 tons, it was necessary to build special cutting support jigs — one for each cutting requirement. Further, to handle the many cutting positions, the Oxygraph had to be raised 4' off the floor.

The operation was highly successful. The shape cutting technique proved extremely economical and fast, and the company was highly pleased with both the technical aid furnished and the results obtained.

• • • •

TECHNICAL SALES SERVICE — ANOTHER AIRCO PLUS-VALUE FOR CUSTOMERS

To assure its customers of high efficiency in all applications of the oxyacetylene flame or electric arc, Air Reduction has available the broad, practical experience of its nationwide Technical Sales Division personnel. The collective experience and knowledge of these specialists has helped thousands to a more effective use of Airco processes and products. Ask about this Airco "Plus-Value" service today. Write your nearest Airco office.

News about AIRCO products

LOW-COST AIRCO No. 10 RADIAGRAPH GAS-CUTTING MACHINE

The No. 10 Radiagraph is a motor-driven portable gas-cutting machine that cuts in straight lines of any desired length, at speeds from 4" to 50" per minute. It also cuts arcs up to 42½" radius, circles from 3" to 85" in diameter, and bevels up to 40° angle. It weighs only 41 pounds net, and is easily moved from job to job.

HEAVY-DUTY AIRCO No. 41 RADIAGRAPH GAS-CUTTING MACHINE

Similar in operation and design to both the No. 10 and No. 4, the Airco No. 41 is built for heavy-duty work. Weighing 130 lbs., and capable of traveling 1 to 72" per minute, it is used for skull cutting, slab ripping and billet nicking. It is also used for multiple torch flame hardening where surface hardening is carried over extended areas . . . and it is ideal for carrying automatic and semi-automatic Airco Heliwelding or Aircomatic equipment.

A three-hose, water-cooled machine cutting torch, a plate-edge preparation device, and similar accessories are available for use with the No. 41.

* * *

Air Reduction supplies Oxygen, Acetylene and other industrial gases . . . Calcium Carbide . . . and a complete line of gas cutting machines, gas welding apparatus and supplies, plus arc welders, electrodes and accessories. Ask us about anything pertaining to gas welding and cutting, and arc welding . . . we'll be glad to help you.

AIRCO

AIR REDUCTION

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ROLLS for ROLLING RODS

TYPICAL SEMI-CONTINUOUS ROD MILL
There's a definite PHOENIX ROLL for each ROLLING requirement
TO POURING REELS
FINISHING MILL ROLLS
USE • CHILLED IRON
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• PHOENIX METAL
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USE
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• PHOENIX "A" ALLOY STEEL

P.R.W.

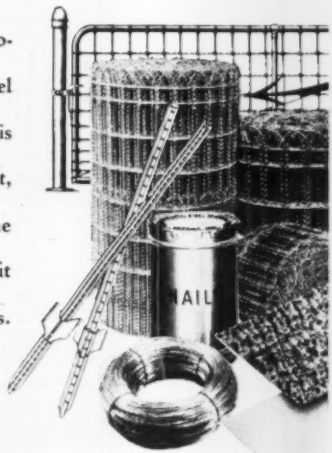
PITTSBURGH ROLLS

PITTSBURGH ROLLS DIVISION OF BLAW-KNOX COMPANY • PITTSBURGH, PA.

SELL YOUR SCRAP

...AND FILL THIS GAP

● The continuous movement of scrap to steel mills is absolutely necessary to maintain a constant flow of finished steel needed by manufacturers and fabricators. When idle, this scrap only adds to your cost of doing business. Without it, mills are unable to maintain adequate production of the steel you need. Call your scrap dealer today. You'll profit by the sale and ensure a better flow of steel from the mills.



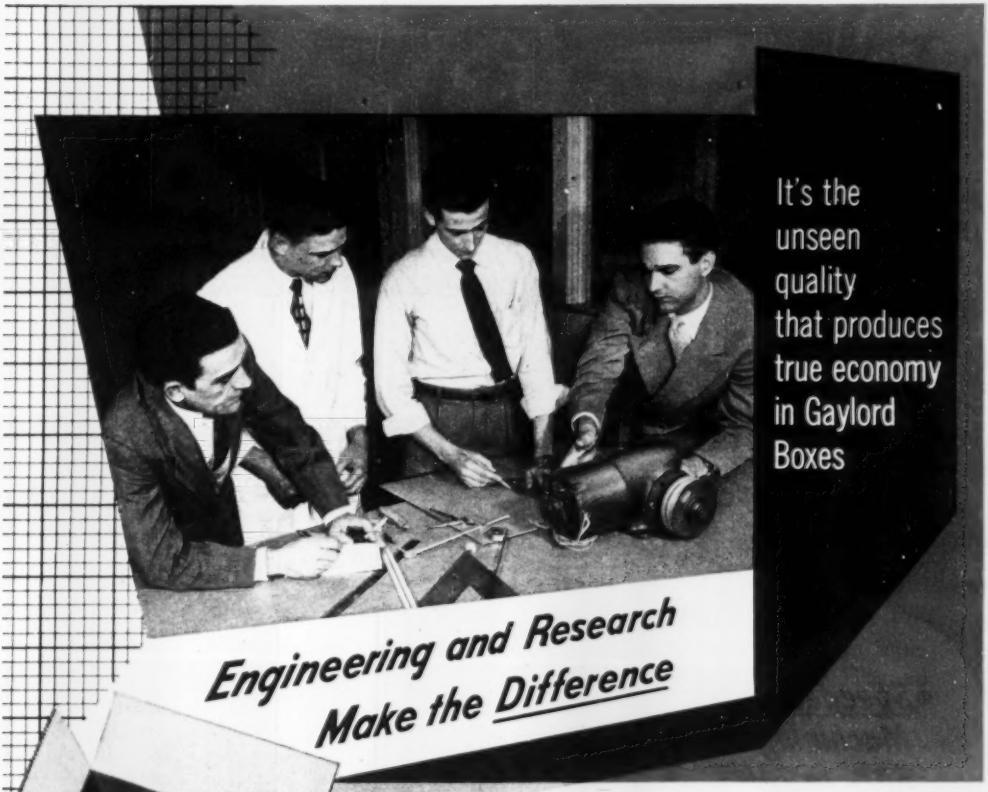
CONTINENTAL STEEL

CONTINENTAL STEEL CORPORATION

GENERAL OFFICES • KOKOMO, INDIANA

PRODUCERS OF STEEL SHEETS, including Continental GALVANIZED, COPPER STEEL Galvanized, KONIK steel sheets Galvanized, UNIFORM SPANGLE Galvanized, DULL COAT, Continental GALVANNEALED, ELECTRICAL, Hot Rolled Pickled, and many styles of Formed Roofing.

ALSO, Manufacturer's Wire in many sizes, shapes, tempers, and finishes, Continental Chain Link Fence, Nails, and other steel products.



All shipping containers of corrugated or solid fibre look very much alike before they're shipped. The appearance and condition of the merchandise when it reaches the final destination tell the story of true packaging economy.

The creative research and special engineering devoted to each type of container by Gaylord specialists assure better protection for all products traveling in Gaylord Boxes.

Call the Gaylord Sales Office nearest you for prompt packaging service.

CORRUGATED AND SOLID FIBRE BOXES
FOLDING CARTONS
KRAFT BAGS AND SACKS
KRAFT PAPER AND SPECIALTIES

Gaylord Boxes

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This thickness control screw, made from STRESSPROOF steel bar, is a vital part of the asphalt road layer shown laying an air strip at a Pacific base.

COSTS DOWN 25%
PRODUCTION UP 100%

WHEN STRESSPROOF® REPLACED HEAT-TREATED .40 CARBON ALLOY STEEL BARS

- *Speeded Machining 50% to 100%*
- *Eliminated need for Heat Treated Alloy Bars*

In this asphalt road layer, instead of using a heat-treated, hot-rolled .40 carbon alloy bar, STRESSPROOF was specified. STRESSPROOF provided *in-the-bar* the necessary strength and wear resistance, and machined so much easier that production time was cut in half.

STRESSPROOF's unique combination of four important qualities *in-the-bar* is cutting costs and speeding production on many similar defense jobs. STRESSPROOF is twice as strong as ordinary cold-finished bars. Its resistance to wear often makes carburizing unnecessary. It is stress-relieved to minimize distortion, and has *in-the-bar* machinability fully 50% better than heat-treated alloys of the same hardness. Yet STRESSPROOF is less expensive than all cold-finished and most hot-rolled alloy steel bars that have been fully heat treated.

STRESSPROOF is also available with a Ground and Polished finish.

LASALLE STEEL CO.
1414 150th Street, Hammond, Indiana
Manufacturers of the Most Complete Line of Cold-Finished and Ground and Polished Bars in America

La Salle
STRESSPROOF®
SEVERELY COLD-WORKED, FURNACE-TREATED CARBON STEEL BARS

STRESSPROOF IS PLAYING A VITAL ROLE IN NATIONAL DEFENSE!

A very large proportion of STRESSPROOF production, today, is going into defense jobs. However, from time to time sample bars may be available for testing purposes.

A NEW WAY
to finish inside diameters

Work being inserted on belt after foot pedal spring has released tension. This new Behr-Manning development uses standard belt backstand parts.

This novel BEHR-MANNING abrasive belt strapping machine makes scissor eye finishing and other inside grinding, polishing and deburring operations quick and profitable. A foot treadle releases the belt tension. Belt is removed from idler, threaded through the work and replaced. It takes only a few seconds and you're all set for a fast finishing operation. Try it on your own work. Ask us for a demonstration.

NEW AND FASTER BELT FINISHING METHODS ARE A REGULAR PART OF BEHR-MANNING APPLICATION SERVICE. It will pay you to check on the latest methods of finishing your own work—at one of our local Demonstration Rooms or in your own plant. Write Department S-11.

BEHR-MANNING ®

NORTON abrasives®

BEHR-MANNING • TROY, N. Y.

COATED ABRASIVES • SHARPENING STONES

PRESSURE-SENSITIVE TAPES

EXPORT: BEHR-MANNING OVERSEAS INC., NEW ROCHELLE, N. Y., U. S. A.

SWEET MUSIC FOR YOU

...THROUGH THE ALL-ROUND

VERSATILITY

of Easy-Flo *and* Sil-Fos

They join ferrous, non-ferrous and dissimilar metals

They make joints fully as strong as solid metal

They make ductile joints that stand heavy stresses and strains

They make joints that are liquid and air-tight

They make joints that transfer heat readily

They make joints high in electrical conductivity

They make joints that resist corrosion

They'll give you any production you require

They make neat joints that need little or no finishing

■ When it comes to getting jobs done—whether for domestic or defense production—EASY-FLO and SIL-FOS, the well-known low-temperature silver brazing alloys, are just about tops as industry's most versatile production "tools." What's more, they're "tools" any shop can use, from the little repair place on Main Street to the largest industrial plant in the country.

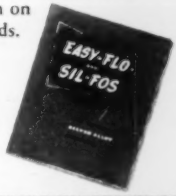
With just a brazing torch for example, you can—join copper and brass and iron pipe and tubing—make all kinds of electrical connections—fabricate a wide range and variety of ferrous, non-ferrous and dissimilar metal parts—do all kinds of installation, maintenance and repair work involving metal joining.

If you want a dozen or 50 joints a day, you can get them with a single or double tipped torch. Heat by hand—or fix the torch to a bench . . . the speed of EASY-FLO and SIL-FOS brazing will surprise you.

If you need a million joints, you can get them by doing your EASY-FLO and SIL-FOS brazing with a conveyor furnace, a set-up of oxyacetylene or gas-air burners, or a "push button" induction unit. And get this—*your savings in time and labor, in every case, will quickly write off the equipment cost.*

WRITE FOR THIS FREE BULLETIN

BULLETIN NO. 20 gives the whole, remarkable story of EASY-FLO and SIL-FOS brazing as well as specific information on joint design and fast heating and production methods.



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FOUNDED 1867
QUALITY · SERVICE

HANDY & HARMAN

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SKILL
helps make fine steels at JESSOP

There is a tradition of fine steelmaking at Jessop that acts as an incentive for greater skill to the men on the production team. Every millman, every melter . . . every single man in the Jessop Works takes pride in the fact that the name of Jessop has stood for the best in special steels for nearly two centuries. He is determined it shall continue to lead for many years to come. You can buy with confidence the custom-made steels made by Jessop men.

HIGH SPEED STEELS · HIGH SPEED BITS · PRECISION GROUND FLAT STOCK · HIGH SPEED AND ALLOY SAW STEELS · HOT WORK DIE STEELS · COLD WORK DIE STEELS · CARBON AND ALLOY STEELS · STAINLESS AND HEAT RESISTING STEELS · VALVE STEELS · STAINLESS-CLAD STEELS · CAST-TO-SHAPE STEELS · COMPOSITE TOOL STEELS · ARMOR PLATE

JESSOP
STEEL COMPANY · WASHINGTON, PENNSYLVANIA

GREATER OUTPUT

...and greater accuracy, better finish when you machine with TEXACO

WHATEVER the type of machining or the metal being worked, the proper *Texaco Cutting, Grinding or Soluble Oil* keeps the tool sharp longer, prevents metal distortion, chip welding or wheel loading. Greater accuracy and better finish result. Work goes faster, too. You have less scrap, fewer rejects. Production increases.

All this also means lower costs—lower costs for machine maintenance, lower unit costs for whatever you make.

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STEEL

The Metalworking Outlook

November 5, 1951

Steel Shortage: Who's Right?

"The man who is figuring on a surplus of steel in 1952 is figuring on a collapse of the economy." So says Defense Mobilizer Charles E. Wilson, in response to statements by Bethlehem Steel Co.'s Chairman E. G. Grace and others that adequate supplies in some steel products would come sooner than the government thinks (p. 68). The odds are that most steel users are going to continue to have a difficult time getting most products all during 1952.

New Steel Ceilings Proposed

Testimony being turned up by Sen. Blair Moody (Dem., Mich.) and his procurement subcommittee reveals steel purchasing troubles are still legion, especially among small consumers. Watch for the committee to come up with a recommendation to OPS that steel price ceilings be set on a dollar-and-cent basis to replace the present base period pricing method. He thinks the new technique would kill gray market sales, many of which are legal under the base period system.

Pick-Choose Rule Revised

Revision in the pick-and-choose steel order (Dir. 3 to M-1) permits steel companies to sell 100 per cent of their output on a pick-and-choose basis in the first 30 days of the 45 days' lead time. It eliminates the 10 per cent of output originally set aside on a first-come-first-serve basis for buyers in the last 15 days of lead time. Result: Users who order in the last 15 days may be out of luck. The 15-day period for January ordering began Nov. 2. Effective date of the revision was Nov. 1. The new ruling will probably stick for only a month or two, while the whole pick-and-choose set-up is being reviewed.

Action on Renegotiation

The new Renegotiation Board is at last lumbering into action. Partly because it was so long in getting organized (the law establishing it was passed last March), the board has extended until next Mar. 1 the deadline when defense contractors and subcontractors must file their financial statements if their 1951 fiscal years end prior to Nov. 30, 1951. The board's office is in Room 7216, GSA Bldg., Washington 25.

Economic Plateau Ahead

Backlogs are declining somewhat in such bellwether industries as gray iron and malleable castings (pp. 76, 77). The rate of new orders coming in has also slipped in as basic an industry as machine tool building. Those indications don't mean that the economy is headed for a decline, but they do hint that we can expect a leveling off in activity, at about the present high plateau, in the first quarter of next year. The decline in consumer durable goods production will be

Production-Engineering News—p. 93 The Market Outlook—p. 161

especially marked early in 1952, a drop that will not quite be counterbalanced by the increased military production.

Small Business Makes Out

Small business is getting and will continue to get a good share of the defense contracts. During the fiscal year ended June 30, 1951, the Army let 1,358,869 contracts, of which small businesses (up to 500 employees) received 1,029,805 contracts with an aggregate value of $4.3 billion. The small business share was 30 per cent of the total prime contract dollars. In a study of $900 million worth of primes let to big business during the last fiscal year, small business got 42 per cent of the subcontract dollars.

Tax Laments Mount

"Intelligent planning for any business operation is impossible when management is confronted with taxes that are applied retroactively for a period of nine months as was just done by Congress." So says Inland Steel Co. Chairman Edward L. Ryerson; his views echo those of practically all businessmen as the nation's corporations start shouldering the heaviest tax burdens in their history. Companies that make products subject to new excises expect a double blow. Some auto firms are braced for sharp drops in demand for even those cars they can build because the excises add $30 to $130 on the price tags of their models.

More DXs?

A movement is afoot to administer the super-priority DX system through Commerce Department field offices by the second quarter of next year. The administration is handled entirely in Washington now. The contemplated shift means that government planners may be considering loosening up in granting the top-urgency priority. Thus far it has been granted very sparingly. At the outset, NPA alone could apply the symbol, but now the Department of Defense and the Atomic Energy Commission may also apply it to expedite materials in exceptional cases. That broadening of the approval power also indicates that more of the priorities will be given.

Straws in the Wind

NPA will enclose letters of condolence with first-quarter CMP allotments to firms cut 20 per cent or more below their base period figures; the message will tell the whys and wherefores of the cut . . . Wage Stabilization Board has turned down a proposal for especially high wage ceilings for about 75,000 workers in the tool and die industry . . . W. Cordes Snyder, new Blaw-Knox Co. president, says his company is spending $3.5 million on expansions that will enable it to produce heavy machinery in competition with Mesta Machine Co., United Engineering & Foundry Co. and others.

Here and There in Industry

Fuel and power shortages will take their customary toll in plant shutdowns this winter (p. 65) . . . Steelmakers push expansions (p. 67) . . . Sales pattern of milling cutters is being threatened (p. 69) . . . Progressive rail strikes are being planned (p. 69) . . . Competition grows keener for Air Force contracts (p. 70) . . . Problems of testing confront gear makers (p. 71) . . . Tory victory is boon to metalworking (p. 75).

You can't afford hand-polishing any more

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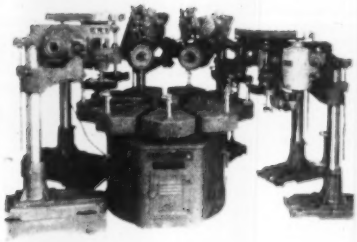

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"Here's why we're Desperate for more scrap"

"Know how much steel scrap one of these open-hearth furnaces uses?" an Armco first-helper asked the other day. "It eats up 400 tons every day—enough to fill 12 railroad cars. And it's only one of many hundreds of furnaces in the United States.

"Every time I look at our scrap pile I wonder if there will be enough for tomorrow. That's how close we're running. And so is every steel mill, I guess. That's why we're desperate for more scrap."

Yes, the nation's steel mills *are* desperately in need of more iron and steel scrap. More scrap is needed today than ever before because steel-making capacity is greater. It is due to reach 117 million tons in 1952.

Only management action in industry can help insure an adequate supply of scrap. Many industrial leaders have named a permanent "salvage committe" for their plants and yards.

Urge *your* committee to check every questionable piece of equipment, and list all obsolete dies, jigs and machines. Then call your scrap dealer.

Remember, scrap resulting from current steel production isn't nearly enough to do the job.

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ARMCO STEEL

His "Last Prize"

Reaction in the United States to the result of the general election in Britain is a mixture of elation, disappointment and deep concern. Elation because the experienced Winston Churchill is back at the helm; disappointment because his majority of seats in parliament is so slender; and deep concern because Britain's plight is so serious that it may be beyond the power of the dynamic Churchill to correct it in time.

Taking these three reactions in reverse order, there is no question that Mr. Churchill's most immediate problem is to tackle Britain's urgent financial crisis. The Kingdom is spending more than it is taking in. The new prime minister must act quickly to ward off insolvency. He can permit the pound to drop again, negotiate more aid from the United States, or stimulate more productivity at home. In adopting any of these or other remedies he must ask for sacrifices that will be distasteful to Britons. As "The Economist" puts it so aptly, "we pray that the new ministers will conceive it to be their job to be successful rather than to be popular."

As to the popular vote, the almost 50-50 split along class lines emphasizes a great fundamental weakness in the free world. In many western nations, including France and the United States, no political party is strong enough to function boldly. These slender majorities force government administrations to rely too much upon compromise.

This brings us to the inspirational aspects of Mr. Churchill's victory. If he can surmount the initial hurdles of his new responsibilities and remain in power long enough to assert leadership in international problems, he could conceivably alter the complexion of the cold war between the free and slave nations. He might produce the spark that would break the stalemate that has resulted from the mediocrity of leadership in Britain and the United States in recent years.

Should Winston Churchill succeed in moving world relations with the Kremlin off the present dead center, he would indeed make good on his aspiration for his "last prize"—the right of trying to prevent World War III.

E. L. Shaner

EDITOR-IN-CHIEF

WINTER FUEL OUTLOOK: Even the best of luck as to weather during the approaching winter cannot save industry from scattered plant shutdowns because of fuel and power shortages. According to the present outlook, conditions will be no worse than those experienced during last year's severe winter and they may be better.

Barring severe strikes, there should be no shortage of coal or fuel oil. Capacity for elec-

tric power production has been expanded greatly, but new demands on the part of industry also have been mounting steadily. Even so, supplies of electricity in most industrial areas will be sufficient throughout the winter. In the Northwest, where the danger of shortage is greatest, capacity could be adequate provided water supply is not shut off by prolonged freeze-ups.

Industrial users of natural gas are almost certain to suffer from sporadic curtailments. This will be particularly true of plants in the gas-using areas of Michigan, northern Ohio and Alabama. Most of these companies have stand-by equipment in which other fuels can be used.
—p. 65

* * *

CHURCHILL'S EXAMPLE: Executives of American metalworking companies think the shift in government in Great Britain will be reflected by developments along three lines. First will be denationalization of British steel. This should not be too difficult. Secondly, Prime Minister Churchill will be more amenable to ideas of co-operation between Britain and nations of Western Europe, such as are contemplated in the Schuman plan, than was the Labor government. Thirdly, the Conservatives are likely to grasp the importance of distributing raw materials of the free world more readily than did their predecessors.

Above all, as head of a nation that is hard pressed financially, Churchill will be a strong influence against reckless spending. Attlee and Truman were a free-spending team. Churchill will introduce a spirit of financial responsibility which cannot be ignored even in Washington.
—p. 75

* * *

SMALLER BOLTS AHEAD: Speaking at the annual meeting of the Wire Association in Chicago, W. E. Hill Jr. of Russell, Burdsall & Ward Bolt & Nut Co. declared that the trend is definitely toward the use of smaller bolts. He predicted that Specification C-1038 may become the "volume" steel for bolts "within a short period of years."

If this higher carbon steel is to replace steel of lesser carbon content and if tensile strengths and physicals are to remain the same, then the bolt of C-1038 must be of smaller diameter, properly heat treated. If the trend toward greater use of C-1038 materializes, steelmakers will have to install more annealing, normalizing or spheroidizing equipment and bolt and nut manufacturers will need more heat treating equipment.

Not to be overlooked in this trend toward the use of smaller bolts is the saving in steel consumption. Again it is a case of doing more with less.
—p. 107

* * *

POWDER AIDS CUTTING: Thanks to a considerable amount of development work extending over more than a decade, cutting and scarfing of stainless steels with a conventional blowpipe now is accomplished with ease. The key to the solution of this once difficult problem is the introduction of the proper powder into the cutting zone of an ordinary oxygen cutting flame.

The first indication that this method would work occurred early in 1940 when it was discovered that powdered ferromanganese additions to a high-purity oxygen stream produced an exothermic reaction permitting rapid oxidation of high chromium stainless steels. Later, means for feeding the powdered ferromanganese were developed and still later a long series of experiments with various powders was conducted which led to the present standardized procedure known as powder cutting. It is used profitably for many purposes other than cutting of stainless.
—p. 94

* * *

MAKE ALUMINUM CANS: Reynolds Metals Co. is developing a number of containers which conserve the use of tin. One of these is a can made of aluminum foil which can be used for many applications in which cans of tin plate now are required.

The body of the can is made by winding a strip of aluminum foil into two or more layers giving a total metal thickness sufficient for the structural requirements of the can wall. This strip may be printed outside and a layer of thermoplastic material applied to the inside surface sufficient to give a thoroughly bonded structure by heat sealing.

In production, the strip is wound to a diameter slightly smaller than finally desired. This loose coil is inserted in a tube having the desired diameter, expanded and heated to bond the structure. Top and bottom edges are flanged to take top and bottom closures, which are crimped in place by conventional methods.
—p. 97

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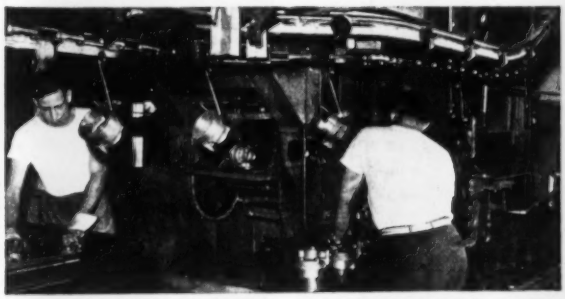

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Production interruptions there will be this winter because of occasional fuel and power shortages. But the curtailments promise to be no more frequent than last year, especially if we have mild weather. You will be in good shape if you have stand-by fuel facilities.

Plant Shutdowns This Winter?

Fuel and power shortages will cause sporadic industrial curtailments this winter, even if we have normal weather, but the problem will be no worse than last year

RESIGN yourself. Scattered plant shutdowns because of fuel and power shortages will occur this winter even if we have normal weather.

But the situation promises to be no worse than last winter, when the weather was unusually severe, and it may be a little better—especially if the weatherman is kind and if no strikes take place in coal mines and at East Coast docks.

The Big Ifs—The major difficulty for much of industry next winter will be natural gas. Michigan, northern Ohio and Alabama users of the fuel experienced sporadic curtailments in past winters and probably will have to endure the same in the next few months. Power capacities throughout the U. S. are ample—even in the Pacific Northwest unless drought or ice-filled streams hamper hydroelectric operations. If no strikes are called, coal will be plentiful all next winter. If no major transport or dock strike difficulties arise, oil will be available to most U. S. industrial users in coming months.

On the basis of a normal winter, here's what fuel and power users can expect in principal areas:

No Trouble in New England

There will be no fuel and power problems for New Englanders this winter. More than 50 new electric power generating units have been brought into service in this six-state region since the end of World War II and about 15 more are abuilding. With a peak load demand expected to be slightly less than 4 million kilowatts, and a capacity of somewhat more than 4¼ million kilowatts by the end of 1952. New England's metalworking industries are taking almost three times as much power now as they did in 1939. Their present consumption is estimated at 30-35 per cent over the peak war year 1944, and bids to continue the rise.

Natural gas for the first time is moving into this area, but it will not be a widely used industrial fuel for another five years. Fuel oil and coal are battling for the industrial market. Price advance in bunker fuel oil made bituminous coal, which currently is offered freely at below-ceiling prices, a better buy for this winter. Both are in more than adequate supply, and not even a prolonged coal strike would cause any industrial hardship.

Strikes May Hurt New York

Coal, fuel oil, gas and electricity are available in sufficient quantity to prevent any need for worry on the part of industrial users. Two imponderables would change this rosy picture: Recurring dock strikes would pinch off supply of fuel oils; rail strikes, being hinted as in store, would also raise hob. Consolidated Edison, the leading power company here and supplier of both gas and electricity, has taken more than normal precautions against a coal strike. Its electric generating capacity, expanding in the period 1946-1953 to the tune of $500 million, will have about an 8 per cent margin in excess of peak demand. Becoming increasingly important power takers in this area are the aircraft and other defense plants on Long Island.

As in New England, coal has the price edge on fuel oil.

PIPELINES: INDUSTRIAL LIFELINES
. . . stand-by facilities recommended

Cleveland: Not Enough Gas

Northern Ohio, troubled occasionally every winter by a greater demand for gas than can be accommodated, is in for the same thing this winter. Depending on how the weather man treats them, gas-using companies can expect interruptions for all or part of 20 days, as occurred last winter. Supply of gas has been expanded but not apace with demand. Despite the probability of gas curtailment from time to time, companies wanting to locate in the area or expanding their local operations can do so without encountering formal restriction by the utilities. The gas and oil suppliers usually recommend stand-by facilities.

Oil as an industrial fuel comes after gas and coal here, and is the stand-by fuel in many cases. Only spot shortages resulting from transportation failure could interfere with its supply. Coal supplies generally are high. Electrical generating capacity is sufficient for this area: additional capacity is being brought in by Cleveland Electric Illuminating Co. to keep its safe margin.

Defense Hits Cincinnati

Defense work in this area is upping demand for fuel and power appreciably. Major plants responsible include General Electric's jet engine facility, not yet in full operation, and a uranium processing plant. Largest power and gas user is Armco Steel Corp., and Newport Steel Corp. is another substantial user. Staggered shifts may be resorted to as a load-spreading method. To keep gas demand within supply bounds, the utility requires stand-by facilities for new industrial installations. In the past two winters gas was curtailed to industries three times, but a steady increase in the flow of gas into this area may make

such interruptions unnecessary from now on. A short pipeline, delayed presently by the pipe shortage, is being sought to increase supply by about 16 per cent.

Planning against the possibility of power shortages, the utility has a $40 million project under construction, with a 100,000-kw unit coming in by April and a similar unit due in operation in June. Coal and fuel oil stocks are ample. The oil reserve is more vulnerable to emergencies than is coal.

Birmingham Expects Cutbacks

Although new gas, oil and electricity-using installations are not restricted, stand-by facilities are recommended to gas users. Oil is mainstay as the alternate fuel. Gas service was curtailed 18 times last winter to industries on an "interruptible" basis. A like situation probably will occur this winter, mainly because of delays encountered in Southern Natural Gas Co.'s $20 million expansion project and the conversion trend to gas from coal. Defense work here requires considerably more fuel and power than normal civilian demands.

Michigan Objects

What happens, gaswise, to local industries will be decided in Washington before yearend. The gas supplier to Wayne county and to a string of sizable industrial communities stretching from Detroit to Muskegon is battling with Panhandle-Eastern Pipeline Co. to keep that company from scaling back its daily deliveries of natural gas to Michigan Consolidated Gas from the present 125 million cubic feet to 87.5 million cubic feet on Jan. 1. Industrial firms in Michigan Consolidated's area which have "interruptible" contracts will get no gas through the winter season. This rule has made it possible in the past for those companies with non-interruptible contracts to be insured against any curtailment. If Panhandle gets its wish, frequent curtailments to companies which have seen no need to install stand-by facilities are in store. Present delivery of natural gas to the area, including that bought from Panhandle, is 330 million cubic feet a day, a quantity which will almost be doubled when a second pipeline from the Austin Field is completed.

Electricity generating capacity presently contains an 8-9 per cent cushion over the peak demand load of southeastern Michigan. Detroit Edison's capacity by 1953 will almost double the 1943 potential. Staggered shifts may be desirable when Michigan's war industry begins to be felt, powerwise. But in the near-term there is no worry about availability of power. Most of this area's defense work is in fabrication and assembly, not large power or fuel users.

GENERATORS AT GRAND COULEE
. . . supply paces demand in most areas

In outstate Michigan where Consumers Power Co. supplies both power and gas, electric generating capacity has been increased 64 per cent since 1945 and is due for another 20 per cent expansion by 1954. The company is taking on an additional 10,000 gas-using industrial and domestic customers currently and adheres to its policy of guaranteeing the supply to them. Coal and oil supply at all important consuming centers in the state is adequate for any emergency. Coal interests say industrial consumers acted on their suggestion that as much coal as possible be stored in anticipation of transportation or mining troubles this winter.

Good Prospects for Chicago

No gas or electricity use curtailments have been imposed in recent years by the two utilities serving the Chicago area, and none are anticipated this winter. Peoples Gas, serving the city, requires that stand-by fuel facilities—usually oil—be installed, and Public Service Co. has a similar requirement. No difficulty in keeping stocked with this industrial fuel or with coal is expected.

To keep electric power capacity ahead of projected demand, Commonwealth Edison and Public Service Co. this year is adding 300,000 kw to its 2,652,000-kw capacity and has an additional 620,000 kw program scheduled for completion by 1954. By next month a 1400-mile 30-inch pipe line from the Gulf Coast to Joliet will be completed to increase the supply of natural gas in the northern Illinois area.

Water and the Northwest

In the Pacific Northwest the weather this winter will determine whether power production will meet normal demands. The serious situation of a month ago when interruptible power was cut off was remedied by good rainfall in October. The future is uncertain; freeze-ups in Canada, northern Idaho and Montana will put power users behind an icy eight-ball. There will be no crisis if rainfall is normal and warm weather prevails. Eleven major power companies are in the regional pool, interchanging power so that local deficiencies can be prevented. About 12 per cent of the area's power can be steam generated in stand-by plants using fuel oil and sawdust. The increased demand for electricity in the area is caused by establishment of several aluminum plants, general industrial development and the expanding use industrially and domestically of electricity. Producing facilities with capacity of an additional 980,000 kw are scheduled to come in by 1956. But in the meantime the area is going to be in fairly constant seasonal trouble.

There is no coal shortage and none anticipated. Fuel oil likewise is in good supply. There are no restrictions on use of gas. Seattle Gas Co. is taking on new industrial business, and plans to bring in natural gas from Alberta by 1953. Industrial gas consumption presently is about 10 per cent of local use, but Alberta supplies will permit the utility to allocate about 80 per cent for industrial purposes. Largest local consumer of electricity and gas is Boeing Airplane Co. American Can Co. is second to Boeing in use of gas.

TVA Signs Record Coal Contract

Tennessee Valley Authority has contracted for delivery of 18 million tons of coal over the next ten years, at a total cost of $63 million. That contract, plus others recently signed, could account for total purchases by TVA over the next decade of more than 32 million tons of the fuel.

The history-making contract was made to supply bituminous for generating electricity in what was intended originally to be a water-power project exclusively. Water power cannot provide the energy needed to meet the demands for power in the TVA region. Currently, about 14 per cent of TVA's power is generated by coal.

Youngstown Expands

The steel company will spend $40 million on finishing facilities at Indiana Harbor

YOUNGSTOWN Sheet & Tube Co. will spend another $40 million on expanding its finishing facilities at its Indiana Harbor, Ind., plant, Chairman Frank Purnell announces.

That is in addition to $100 million expansion of coke, iron and steel facilities already under way and will help round out the company's Chicago district facilities. An NPA certificate has been issued. Purnell explained that the program was planned earlier but was delayed by the NPA moratorium on expansions.

The Anatomy — Projects will include building a 56-inch cold strip mill which may be easily converted to 66-inches when the present 56-inch hot strip mill is widened at some future date. The program also includes adding a fourth heating furnace at the hot strip mill. It originally had two heating furnaces, but is adding the third furnace in the $100 million expansion already under way.

Purnell said bids will be taken soon and contracts let and it is expected the new facilities will be completed late in 1953.

Capacity Up — The cold mill will have a speed of 3500 feet a minute on strip and 4,000 feet per minute on tin plate. It will add about 600,000 tons to the company's cold rolling capacity, giving it 960,000 tons at Chicago and 550,000 to 600,000 tons at Youngstown.

Mr. Purnell said the present expansion is running a little behind schedule. The first four of the eight new 250-ton open hearths will be finished early next year and the other four late next year. Besides, the company is building a 1400-ton blast furnace and 75 coke ovens which will be completed in time for the open hearths. Company's Chicago bessemer will be dismantled.

J & L Taps New Open Hearth

Jones & Laughlin Steel Corp. tapped the first of 11 new open hearths at its Pittsburg works last Tuesday.

Six of the 11 furnaces comprising the new No. 4 shop will be making steel by mid-December, and the balance will be in by late March. All units in the $70 million project have a capacity of 250 tons of steel per heat. The new shop will add 2 million tons to annual potential but obsolete capacity of 780,000 tons has been abandoned and the net increase will give the Pittsburgh plant a total capacity of 3,357,500 tons.

BIG SHOT: The loud report that 500 business and civic leaders heard at the tapping of Jones & Laughlin's first of 11 new open hearths at its Pittsburgh works was from a bazooka jet. Charles E. Wilson officiated

The open-hearth facilities represent only part of the steelmaking improvements at the Pittsburgh works. Others include a new blooming mill, three new soaking pits, scrap handling equipment to feed the furnaces with some 70,000 tons of scrap a month, a new 10-inch bar mill, new central scarfing facilities and expanded rolling facilities for a 96-inch strip mill. In 1951 and 1952 J & L is spending about $103 million at the Pittsburgh works, some $43 million at the Aliquippa, Pa., works, about $34 million at the Otis works in Cleveland and approximately $18 million in new raw materials facilities. J & L's total capacity is now 4,848,500 ingot tons a year. Expansion and modernizations will increase that to 6,506,500 tons.

Officiating at the tapping ceremonies was Defense Mobilizer Charles E. Wilson.

Le Tourneau Furnace Readied

The first of three electric furnaces to be installed at the new steel plant being built at Longview, Tex., by R. G. Le Tourneau Inc. will be melting steel scrap into ingots within 30 days.

Bob Flanagan, Le Tourneau's Texas manager, says the plant will produce 1000 tons of steel daily. It's now 60 per cent completed. The rolling mill is scheduled to begin rolling the first steel some time in January. The electric furnace is being put into operation first to build up a supply of ingots because the mill will have a greater capacity than the one furnace. Later, two other furnaces will be added to match the mill's capacity.

A forming mill for producing rectangular and square tubing will be added to the plant sometime next year.

Amortization Committee Meets

A newly formed Committee on Tax Amortization and Negotiated Contracts has begun meeting in Washington. Its job: To provide the Defense Production Administration with recommendations for general policy guidance on amortization and negotiated contract matters.

The committee is chairmanned by Judge C. S. Desmond of the New York State Court of Appeals.

DPA is postponing until Jan. 1, 1952, adoption of its system of precertification as a requirement for issuance of necessity certificates for tax amortization on new plant construction started after Nov. 1 (STEEL, Oct. 29, p. 37). Until Jan. 1, you may apply (within six months after construction is started) for rapid tax amortization without having obtained prior approval for the project.

Judson Steel Expansion Cost Up

Judson Steel Co., Emeryville, Calif., which earlier this year received a certificate of necessity for a projected $4,600,000 expansion, may spend considerably more than that sum before the conclusion of its program, officials of the firm have indicated. Higher costs are given as the reason.

The program calls for considerably more rolling equipment and enlarge-

ment of ingot making capacity. Diversity to meet the needs of the defense program as well as the civilian economy is the prime aim. New products will include small angles, squares and rounds and other light structural shapes. Main production item at present is steel reinforcing bars.

Ingot capacity will be boosted to 120,000 tons a year from the present 62,000 tons and finished steel products to 100,000 tons from 60,000 tons.

Officials of the firm still are undecided whether to increase ingot capacity through enlargement of the present open hearth furnaces or install new electric furnaces. In place are three 30 ton capacity open hearths, all taking a 100 per cent cold charge. If expanded they will be moved up to 50 tons capacity each.

Taxes, Costs Grind Down Steel Earnings

Steel companies will try to counter forthcoming wage demands with reports on their declining profits for the first nine months of 1951

EARNINGS reports will be the steel companies' answer to the United Steelworkers (CIO) as wage negotiations begin Dec. 1 or earlier. If Philip Murray's union wins its wage demands, the wage formula for the entire nation could well be broken.

The nation's three largest steel companies—U. S. Steel Corp., Bethlehem Steel Co. and Republic Steel Corp.—all report a paradox in their performance for the first nine months of 1951: Higher production and sales but lower profits than in 1950. Profits were ground finer by taxes, plus higher costs.

Warning—Both U. S. Steel Chairman Irving S. Olds and Bethlehem Chairman E. G. Grace warn that higher wages must mean higher steel prices. U. S. Steel's net profit for the first nine months was $134,733,557, against $178,821,540 for the like 1950 period. Net profit for the quarter ended Sept. 30, 1951, was $27,936,060, compared with $59,742,302 for the third quarter of 1950. In the first nine months of this year, Bethlehem earned $67,155,347, against $90,804,414 in the same period of 1950. Third-quarter net earnings this year hit $18,460,372, against $23,628,770 last year. This year's nine-month net income for Republic was $39,226,256, against $56,384,618 in the same months of 1950. Third quarter showings were $12,496,763 this year, $18,682,542 last year.

The new tax law took two-thirds of Republic's profits. U. S. Steel set aside a record $295 million for federal taxes on income for the first nine months of 1951. Bethlehem set aside $135 million for taxes. The staggering taxes are caused primarily by the new levies, but a contributing factor to the size was the companies' record sales from record production. U. S. Steel in nine months turned out 18,344,497 net tons of steel products; Bethlehem produced 4,054,664 tons in the third quarter; 1951 will probably be Republic's first $1 billion sales year.

A Matter of Output—In the problem of production, Mr. Grace made warnings that he has uttered before: That a balance between supply and demand will come sooner than the government expects. He says that demand for certain items of steel has started to decline and that there may be a surplus of supplies before the end of next year. John E. Timberlake, general sales manager of Jones & Laughlin Steel Corp., testified before Pittsburgh hearings of the Senate Small Business Subcommittee that demand for steel generally has been declining and that some products now require a hard selling job.

Mr. Grace particularly rapped government estimates that put demand for structural steel more than double the supply. He said that Bethlehem, one of the two largest producers of the product, "is not behind one iota in fabricated steel orders."

Paradoxical Performance: Production Up, Earnings Down

DPA Lists Critical Materials

"The supply of steel and copper is becoming progressively tighter, while supplies of some nondefense materials are showing a tendency to ease." So says the Defense Production Administration in the third edition of its "List of Basic Materials and Alternates."

DPA reports that "copper supplies are almost dangerously short." The suspension of tin purchases due to excessive prices has resulted in considerable reduction in tin's industrial stocks. Lead and zinc production has been hampered by strikes, reduced imports and inadequate scrap collections. Aluminum output also has suffered from strikes, along with scrap and water power shortages. Magnesium, with considerably smaller production but similar difficulties, has nearly maintained its position.

DPA adds for the first time a new grouping of materials—"most critical"—which includes aluminum, lead, tin, zinc, copper, platinum, cobalt, columbium, molybdenum, nickel and tungsten.

DPA cites these examples of materials substitution: For chrome and nickel plate—bright-zinc plating, extra fine aluminum lining pigment, synthetic enamel resembling chrome and aluminum base baking enamel; for copper—steel and plastics in nonfunctional and non-electrical uses; for brass—coated steel and plastics; for steel shipping drums—fiber, lined with polyethylene.

Copies of the DPA lists are available at district and regional offices of the Commerce Department.

Pipe, Tube Capacity Jumps

America's capacity to make steel pipe and tubing has risen 43 per cent

in three years, American Iron & Steel Institute reports.

The steel industry's facilities for making all kinds of pipe and tubing have been increased an average of more than 1.2 million net tons annually in three years to a total of more than 12.5 million tons on Jan. 1, 1951. Further large construction is underway. The most sensational gains have occurred in production of electric weld steel pipe. Capacity is five times higher than prewar. In three years, from 1948 to the start of 1951, the increase in that type of capacity was 153 per cent. Annual potential was 5,128,000 tons on Jan. 1, 1951.

Moreover, much of the large diameter pipe for long distance lines is made by the electric weld process of fabricating plates into pipe.

Some 60 million tons of steel pipe—450,000 miles of it—are in American soil for the purpose of transporting oil and gas.

Less Steel for Export

Exports of American steel will drop sharply in the first quarter of 1952.

Excluding such specialized items as tinplate, steel plates and structurals and the tonnage reserves for materials development programs, only 154,000 tons of general purpose carbon steel are left for commercial export, and 115,000 tons of that have been ticketed in advance for transactions of particular urgency. The 39,000 tons which remain unobligated will be licensed for export by Commerce Department's Office of International Trade only if the applicant demonstrates that the shipment would meet one of these criteria: Essential to direct military production of the U. S. or of a friendly foreign nation; essential to the production abroad of strategic materials for shipment to the U. S. or to friendly nations; essential to direct defense-supporting industry.

Warehouse Appeal Turned Down

Warehouses have poor luck when attempting to get more steel through the NPA Appeals Board.

An illustration is the Posey Steel Products Co., San Antonio, Tex., which requested an adjustment in its base period figure on receipts of warehouse steel. Following a hearing, the board concluded there was "no persuasive showing that the provisions of M-6 were imposing an exceptional or unreasonable hardship on the appellant not suffered by others in the warehouse field."

MILLING CUTTERS
. . . materials o.k., labor a headache

Sales Pattern Threatened

Lengthened deliveries force special milling cutter makers to change their ways

LENGTHENED delivery dates threaten to close out a sales situation for makers of special milling cutters.

A substantial part of their business is to supply the cutting tool for machine tools. Up until now, when a special milling cutter tool design is involved, the original manufacturer of the milling cutter almost automatically gets the replacement business because he has the prints for the original design.

Change in Store — Today's conditions sometimes mean that the manufacturer with the prints can't deliver as rapidly as usual, and the user of the tool is stuck for a replacement. More common now is the practice of the machine tool builder or the user of the machine tool to insist that he get the prints of the special milling cutter. Men in the industry think that this change will have a considerable effect on the industry. It won't disturb replacement patterns in connection with cutters for machine tools sold sometime in the past, but it will effect the pattern on most everything for machine tools sold from now on.

An estimated 200 companies—most of them small—in the U. S. make the 40 different kinds of milling cutters. More than half turn out special cutters, usually the inserted blade milling type.

Much more standardized are the solid high speed and tungsten carbide tipped types. Manufacturers of the standardized variety aren't involved in the threatened change in replacement marketing. For standard milling cutters there's no abnormal scarcity. Delivery on special cutters is about three to four months at the present time.

In Defense—Milling cutter manufacturers are devoting about half their output for defense and much of the rest of their volume is for defense-support programs. Consequently, few are having undue troubles with materials. One sizable defense job requiring milling cutters is in the manufacture of tank track shoes. The large defense buyers include aircraft firms, automotive companies with ordnance contracts and machine tool builders. Normally the biggest peacetime buyer is the auto industry.

Although milling cutter makers aren't having materials problems, their labor headaches are more and more painful. Not only are they short of skilled help, but mediocre productivity among that which they do have is causing concern among the manufacturers.

Brown & Sharpe Settles Strike

The Providence and Greystone plants of Brown & Sharpe Mfg. Co. at Providence, R. I., resumed operations after production had been interrupted by a 14-week strike. Lodges 1088 and 1142, International Association of Machinists, AFL, voted to accept a new company proposal. As a result, a two-year contract was signed with Brown & Sharpe.

Progressive Rail Strikes Planned

Plans are lining up for a progressive strike by the Brotherhood of Locomotive Firemen and Enginemen, initially slated to start against four railroads. B.L.F.&E. president David B. Robertson sent a letter of instruction to district chiefs and says the chiefs will be notified by telegram when to go out.

The strike would tie up all but war materials, troop, hospital and milk trains of the Terminal Railroad Association of St. Louis, Chicago & Northwestern Railroad, its subsidiary the Baltimore & Ohio Railroad, including its Buffalo division and Buffalo & Susquehanna district, and the Louisville & Nashville Railroad. A walkout on the Terminal Railroad, a railroad and industrial switching line, would cripple rail operations in the nation's second largest gateway.

The firemen have been negotiating with the carriers for more than two years, originally over shortening the

work week for yard employees. Later negotiations were broadened to include wage increases and working rules. In recent weeks talks in Washington were reported stalemated.

Scrap: Touch and Go

Iron and steel scrap supply will determine whether or not steel mills can operate at capacity during the winter months. If the scrap campaign now underway succeeds, mills will be able to continue capacity operations. If it falls short of the goal, some furnaces will be shut down.

This was the word given by Manly Fleischmann, defense production administrator and director of the National Production Authority, Edwin C. Barringer, executive vice president of the Institute of Scrap Iron & Steel Inc., and other representatives of the scrap and steel producing industry at a "Scrap for Victory" day at Youngstown Oct. 30.

Even if the drive for industrial, farm, auto graveyard, ship and battlefield scrap succeeds, sporadic shutdowns of furnaces for want of scrap may be experienced during the first quarter.

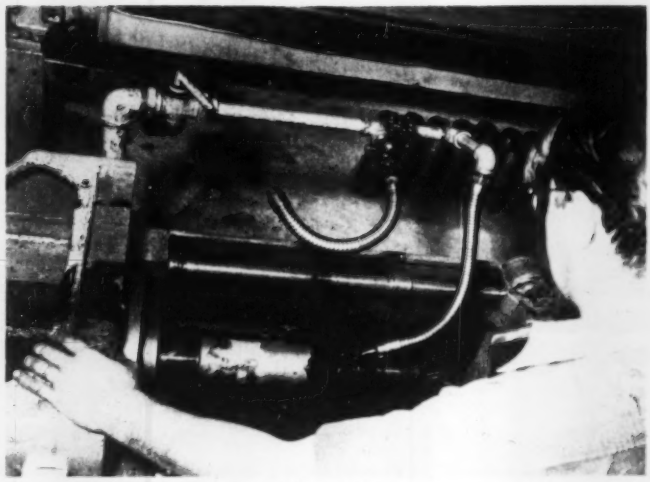
Occasion for the "Scrap for Victory" day was the formal opening of a new scrap preparation yard by Columbia Iron & Metal Co. at Girard, O. (see STEEL, Oct. 29, p. 38).

Defense Spending Mounts

Department of Defense obligated $9.1 billion for major equipment, supplies, military construction and expansion of production facilities in the third quarter.

Those obligations cover orders placed during the three month period and include firm contracts and financed portions of accepted letters of intent with private industry, as well as project orders placed with Defense Department industrial establishments such as shipyards and arsenals.

Procurement of aircraft, ships, tanks, weapons, ammunition, production equipment, electronics and other hard goods amounted to $7.8 billion. Soft goods procurement (clothing, food and petroleum) aggregated $800 million and construction $500 million. Procurement for the Mutual Defense Assistance Program accounts for $161 million of the $7.8 billion obligated for hard goods. In the 15 months following the attack in Korea, Defense obligated $37.3 billion for hard goods, $4.9 billion for soft goods and $2.2 billion for construction.



OTHERS HELP, TOO: One step in the production of an army tank is made by Weaver Broaching Co., Detroit. A major project at Weaver's job-work plant is broaching internal splines on the track wheel support arm shaft for the tank. The shafts are semi-finished machined when received by Weaver, broached on a 2.182 I.D. and then shipped out for finish machining. Several of these shafts are used on each tank and broaching was turned to as a production expedient

Competition Keener for Air Force Defense Contracts

COMPETITION is sharpening up for Air Force defense work. The added edge is largely due to the new Air Force policy of posting bid invitations at all of its Small Business offices.

Copies of Air Force bid invitations and negotiated proposals are posted on the bid boards of regional and district offices for inspection and study. Small business firms can submit bids on any items which they can make.

More Bidding — Visitors at the Small Business office of the Midcentral Air Procurement District in Chicago increased 300% during August. A contract for maintenance stand assemblies which Air Force officials of the Chicago regional office estimate would have received a half dozen bids, had the bid been negotiated, received a total of 128 bids from 452 firms. Twenty-five per cent of all bids received were from midwestern firms and nearly one-third of the bids received were from firms in Illinois and Iowa. An eastern firm which had

Product	Contractor
Broaching Machines	LaPointe Machine Tool Co., Hudson, Mass.
Thread Millers	Wickes Brothers, Division of Wickes Corp., Saginaw, Mich.
Horizontal Hones	E. L. Essley Machinery Co., Chicago
Machinery & Equipment	Hills-McCanna Co., Chicago
	Bahn Aluminum & Brass Corp., Detroit
	Day & Night Div., Affiliated Gas & Equipment Co., Monrovia, Calif.
Ambulances	GMC Truck & Coach Div., General Motors Corp., Detroit
Pickup Trucks	Chevrolet Motor Div., General Motors Corp., Detroit
Carryall Trucks	Chevrolet Motor Div., General Motors Corp., Detroit
Stake Trucks	Chevrolet Motor Div., General Motors Corp., Detroit
45-ton Trailers	Rogers Brothers Corp., Albion, Pa.
Dump Trucks	International Harvester Co., Chicago
Tractors	International Harvester Co., Chicago
Backhoes	Thew Shovel Co., Lorain, O.
Mixing Machines	Read Standard Corp., York, Pa.
Office Desks	Crown Office Supply Co., Chicago
Office Chairs	American Fixture and Mfg. Co., St. Louis
Auxiliary Detonating Fuzes	Schlage Lock Co., San Francisco
Fuzes	Easy Washing Machine Corp., Syracuse, N. Y.
Aircraft Refueling Systems	Agutter Electric Co., Seattle
Tool Kits	Century Tool Co., Palmyra, N. Y.
Electron Tubes	Raytheon Mfg. Co., Waltham, Mass.
	Sylvania Electric Products Inc., New York
Loudspeakers	Glaser-Stairs Corp., Belleville, N. J.
Radio Sets	Lewyt Corp., Brooklyn, N. Y.
Mountings, MT-279	Rudolph Wurlitzer Co., Tonawanda, N. Y.
Power Supplies	P. R. Mallory & Co. Inc., Indianapolis
Spare Parts	R. G. LeTourneau Inc., Peoria, Ill.
Tractor Repair Parts	Caterpillar Tractor Co., Peoria, Ill.
Motor Vehicle Parts	Springfield Tent & Awning Co., Springfield, O.
	Allen Industries Inc., Detroit
Repair Parts	York Corp., Philadelphia
	Buffalo Pumps Inc., Buffalo

previously completed an Air Force contract for this item was underbid by ten other firms.

Advanced Models—The Air Force also announced that Air Force and Atomic Energy Commission contractors have selected 4365 machine tools from reserve stores at Marietta, Ga., and Omaha, Nebr. An invitation is out to Army and Navy contractors to make on-the-spot selections of remaining machine tools to be used on defense contracting work on a lease basis.

Another prime Air Force contract was let to North American Aviation Inc., Inglewood, Calif., for production of two advanced models of the sweptwing F-86 Sabre jet. These planes are designated F-86F and F-86H. Both will be equipped by more powerful General Electric J-47 jet engines which will place them in the over-650 miles-per-hour class.

Other contracts awarded by the government, in excess of $250,000, are shown in table on facing page.

Door Opener for Defense Work

One way being used to open the door for defense subcontracts is the booklet, "We're Ready for Defense Work," produced by Inland Steel Products Co., Milwaukee.

Intended for use by defense contractors, subcontractors and government procurement officers, the booklet describes the company's facilities for defense manufacture, finances, manpower, products normally turned out and defense products made during World War II.

The booklet invites defense contracts or subcontracts from those trying to find a source of certain sheet steel fabrication processes.

Air Force To Build Big Presses

Heavy forging and extrusion presses, larger than any previously built in this country, will be supplied the aircraft industry under a new program started by the Air Force. Cost is estimated at $210 million over the next four years.

Under present plans, 20 heavy forging and extrusion presses will be installed in a number of existing supporting plants and equipment serving the aircraft industry.

Presses up to 18,000 tons now in use in several plants have proved the feasibility of producing large, light metal components more efficiently than by assembling large components from numerous small pieces. Under this program, presses of even heavier capacity are contemplated; under discussion are forging presses of 75,000 tons capacity.

These metalworking companies are presently scheduled to operate the heavy presses under the Air Force program: Wyman-Gordon Co., Aluminum Co. of America, Harvey Machine Co., Kaiser Aluminum & Chemical Co., Bohn Aluminum & Brass Co., Curtiss-Wright Corp., and Reynolds Metals Co.

Problem of Testing

At gearmakers meeting, production checking matters are pointed up

THEIR engineering standards are becoming so high, their specifications so exact that as much science and fine workmanship now must be devoted to the design and construction of equipment for measuring and checking gears as to the creation of machines for cutting and finishing them.

Chicago Meeting — That was brought out at the Chicago meeting last week of the American Gear Manufacturers Association. At a panel discussion on the subject, it was shown that devices formerly used only for laboratory checking of master gears now are being used for production checking. Those measuring machines work to hundredths of thousandths rather than to tenths of thousandths of inches.

Other sessions were devoted to refinements in applied science of gearing as far as strength and operating characteristics are concerned. R. P. Van Zandt presented new conceptions of the so-called "beam strength" of spur gears based to a considerable extent upon his own experiments in Caterpillar Tractor Co.'s research laboratory at Peoria, Ill. Heat problems involved in enclosed gear drives, and methods for reducing or dissipating this heat, were dealt with by E. J. Wellauer of Falk Corp.

Constant Pressure—These and other papers were indicative of constant demands of gear users for gear systems which will transmit more power in less space with less noise and wear than in older and more ponderous systems. These demands come from the automotive and aircraft industries in particular, but they are by no means limited to them. Railway equipment, shipbuilders and industrial machinery builders are making similar demands for more compact and lighter mechanisms.

The meeting occasioned the first public appearance of the newly appointed executive secretary of AGMA John C. Sears. Mr. Sears took over the duties from Newbold C. Goin who is leaving to join a firm of management consultants in Pittsburgh.

CHECKLIST ON CONTROLS

GOVERNMENT control orders are digested or listed each week in this "Checklist on Controls." For complete copies of NPA orders, write to NPA Distribution Section, First Basement, New GAO Bldg., Washington 25. For copies of OPS orders, contact nearest OPS district or regional office. For copies of OPS news releases, write David S. Phillips, director, OPS Administrative Services Division, Temporary E Bldg., Washington 25.

Materials Orders

STEEL DISTRIBUTORS—Schedule 1 to NPA Order M-6A earmarks warehouse stocks of aircraft quality alloy steels for sale only in connection with aircraft, guided missiles and atomic energy programs. Schedule 1 was effective Oct. 26, 1951.

LEAD—Amendment of Oct. 29, 1951, of NPA Order M-76 puts imported pig lead under NPA allocation. Heretofore only domestic soft pig lead was allocated.

Price Regulations

MACHINERY—Correction of Oct. 24, 1951, of Amendment 17 of Ceiling Price Regulation 30 was made to eliminate a clerical error concerning the filing of reports by manufacturers.

LEAD, ZINC—Supplementary Regulation 76 to the General Ceiling Price Regulation authorizes ceiling price adjustments for certain basic metallic products containing lead and zinc so as to reflect the recent two-cents-a-pound ceiling price increase for lead and zinc. SR 76 was effective Oct. 24, 1951.

LEAD, ZINC—Supplementary Regulation 75 to the General Ceiling Price Regulation and Amendment 3 of Supplementary Regulation 7 to Ceiling Price Regulation 22 authorizes increased ceiling prices on chemical compounds containing substantial quantities of lead and zinc. The increase is to compensate for the recent 2-cents-a-pound price rise in lead and zinc. SR 75 and Amendment 3 were effective Oct. 24, 1951.

METAL CASTINGS—Amendment 3 of Ceiling Price Regulation 60 makes various minor changes in this metal castings regulation. Date for putting this regulation into effect was extended to Nov. 10, 1951.

MACHINE TOOLS—Amendment 1 of General Overriding Regulation 15 and Amendment 2 of Revision 1 of Supplementary Regulation 2 to Ceiling Price Regulation 30 clarifies the definition of machine tool. The new definition lists 21 specific types of nonportable power driven machine tools used for the shaping of metal. These are the only types of machines covered by the machine tool regulations. The new definition does not include any tool specifically designed for home workshops, laboratories, model makers, garages or service shops. Both amendments were effective Nov. 3, 1951.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor*

Ford executive on Psychological Strategy Board. Ordnance-developed packaging uses grow. Interior Department urges government power generating facilities in Northwest

RECENT WEEKS have seen a changing attitude toward the cold war.

The fault of leaving the initiative always up to the Russians will be corrected by an aggressive campaign designed to bring about the condition which the Kremlin fears most: A crumbling from within of its slave empire. Recent step-up of radio broadcasts to the Soviet Union and her satellites and the launching of propaganda balloons past the Iron Curtain are a start.

Agitating—Now the campaign is to be broadened to include militant measures—such as helping to organize and support underground subversive movements. Just what is in the wind, of course, isn't being publicized, but an ambitious program is forthcoming. It is being planned by Gordon Gray, astute former Secretary of the Army and now president of the University of North Carolina. He heads the Psychological Strategy Board.

Caliber of men Mr. Gray intends to enroll in this vital effort is shown in his first appointment: William D. Kennedy, on leave of absence from his job as director of publications, Ford Motor Co. Mr. Kennedy, once assistant dean of Harvard Business School, was a lieutenant-colonel in the Army Air Force during World War II and also served as chief of the Plans Section, Office of Strategic Services.

The challenge to Messrs. Gray and Kennedy is obvious. Their job is to bring an early end to the present cold war with Russia and thus make impossible the bloody shooting war lurking in the future.

Wrap It Up . . .

Widespread use is expected to be made of the new packaging material developed by Army Ordnance (STEEL, April 9, p. 47; July 16, p. 70). Experience with it so far indicates that many contractors will be instructed to deliver their products in it. It consists of a cotton scrim bag with an inside plastic-coated layer of aluminum foil. Inside the foil is a layer of kraft paper that has an inside surface coating of a chemical that gives off a corrosion-inhibiting vapor. The vapor protects all metal surfaces, including those that aren't accessible for conventional grease-type coating.

ODM To Help Foundries

SO SERIOUS are bottlenecks in the foundry industry that Office of Defense Mobilization has called a special meeting to discuss them.

ODM Director Charles E. Wilson has set aside November 8 for this purpose. Representatives of 17 government departments and agencies will explore the problems and suggest solutions. NPA and other agencies will probably follow up with new directives.

As a starter, the Army has approved use of the new package for small arms shipped out of inventory to field locations. Whereas it takes an average of three hours to remove the grease-type coating in the field, the gun is ready for instant use on removal from the new package. Eventually, the new packing will be used on a wide variety of metal assemblies and parts; even the largest machines can be packaged in this manner.

Companies that co-operated with Army Ordnance in developing the new package are Shell Oil Co., Monsanto Chemical Co., National Transport Plastics Co. and Marvellum Paper Co.

Power for the Northwest . . .

On the House Union calendar when Congress adjourned was a little-noticed bill which would give the government another toe hold in the electric power generating business.

H. R. 4963 would authorize Bonneville Power Administration to install and operate fuel-fired electric generating plants to compensate for reductions in output of current when the stream flow becomes inadequate as it was this summer and fall. Interior Department backing was given the bill. "The welfare of the country," Secretary Chapman told a House committee, "demands that we take the necessary steps to correct the power deficiency of the Pacific Northwest at the earliest possible moment." The bill will come up for vote at the next session.

More Farm Equipment . . .

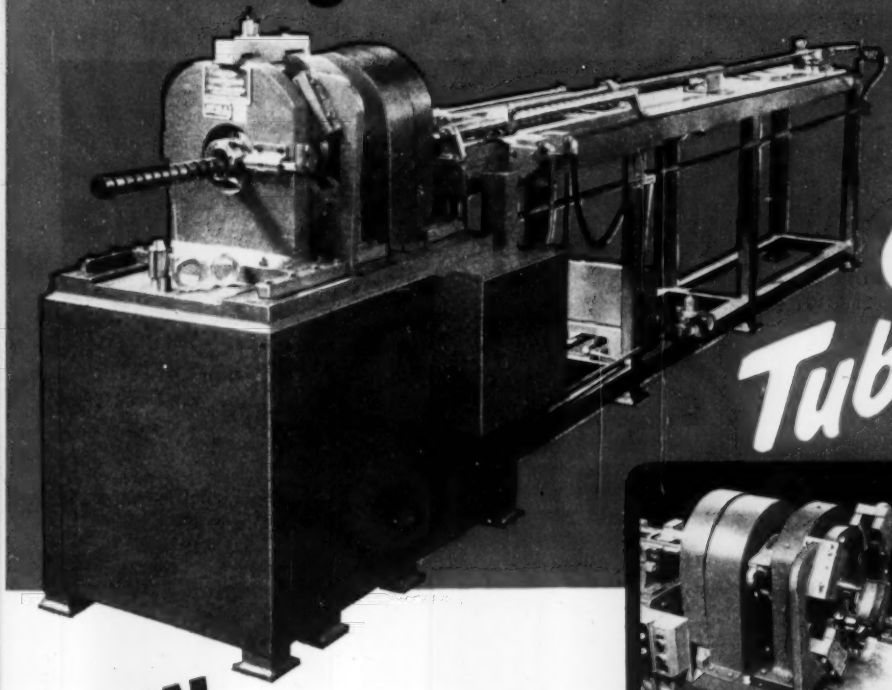
A big future for crop and forage drying equipment is seen by W. V. Hukill, Agriculture Department engineer. Mechanical drying of most harvested grains and forage crops eventually will be a routine farm job, he told a seminar at Agriculture's Beltsville, Md., experiment station. He estimated at only 10,000 the forage driers on farms today.

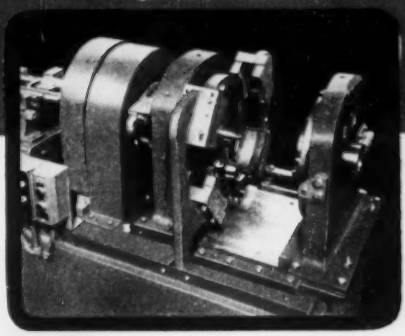
A substantial expansion in the demand for new mobile drying units is expected: Commodity Credit Corp. just announced it will finance farmers in their purchase of this equipment.

Arrivals and Departures . . .

New director of Atomic Energy Commission's Research Division is Dr. Thomas H. Johnson, who has been heading the Physics Department at the Brookhaven National Laboratory . . . Retiring from the Department of Commerce is W. H. Myer, formerly in charge of machine tools in the Bureau of Foreign and Domestic Commerce . . . Irvin R. Kramer, head of the Metallurgy Branch, Office of Naval Research, resigned to become assistant to the president, Horizons Titanium Corp. . . . P. L. Houser returned to International Harvester Co. after a term as deputy director, Metalworking Equipment Division, NPA.

Looking for a Better Way to Cut Tubing?





NEW DUNCAN-McKAY TUBE CUTOFF IS YOUR ANSWER . . .

CHECK THESE OUTSTANDING FEATURES

√ SIMPLICITY OF DESIGN	With economy in mind.
√ SIMPLICITY OF SET UP	Ordinary shop personnel entirely competent after brief instruction.
√ SIMPLICITY OF OPERATION	Fully automatic—fool-proof.
√ SPEED OF OPERATION	Rates as high as 60 cuts-per-minute, depending on length of cut tube.
√ NO LOSS OF METAL	Tube wall is sheared—no metal removed.
√ QUALITY OF CUT	Practically burr free.
√ TUBE STATIONARY DURING CUT	Eliminating chances of marking.
√ CONCENTRICITY OF TUBE	Original concentricity maintained.
√ LENGTH TOLERANCE	Positive stops control travel of feed cylinder—close length tolerances easily maintained.
√ TOOLING	Simple, concentric dies—easily produced in your own tool room.
√ LOW MAINTENANCE	Early models have been in continuous operation—over 2,000,000 cuts with only occasional die grinding required.

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YOUNGSTOWN, OHIO

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ENGINEERS AND DESIGNERS OF EQUIPMENT FOR THE AUTOMOTIVE, FABRICATING AND STEEL INDUSTRIES

ACCURATELY SHARPENED CUTTING TOOLS WILL

cut costs as well as metal

Operation of P&W CUTTER & RADIUS GRINDERS is simple. Their performance will save $$ in any Die Shop or Toolroom — save more $$ in Production Departments by increasing the productive life of Cutters — and save still more $$ in the Grinding Department by paying for themselves in short order. Get full details from any P&W Branch Office.

SAVE $$$ AND DO A BETTER, MORE ACCURATE JOB WITH

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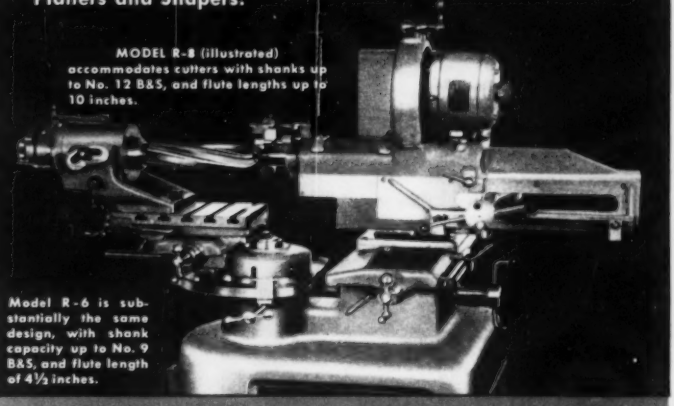
CUTTER AND RADIUS GRINDERS

This versatile Machine is designed for efficient, economical sharpening of End Mills, Keller Cutters and their corresponding Tracers, and Die Sinking Cutters — stock or special. It assures exact radii for ball and radius nose cutters . . . tangential blends . . . uniformity of flutes whether cylindrical or tapered . . . concentricity with shank (therefore with spindle) . . . and provides Cutters that cut cleanly, smoothly, at the most profitable speeds. Due to the versatily inherent in its design it also sharpens Side or Face Milling Cutters, Form and Thread Milling Cutters and Form Tools for Lathes, Planers and Shapers.

MODEL R-8 (illustrated) accommodates cutters with shanks up to No. 12 B&S, and flute lengths up to 10 inches.



Model R-6 is substantially the same design, with shank capacity up to No. 9 B&S, and flute length of 4½ inches.

PRATT & WHITNEY

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Tory Victory: Boon to Metalworking

Mr. Churchill is committed to denationalization of steel, favors the Schuman Plan and may lend greater support to world price control of scarce commodities

WINSTON CHURCHILL'S narrow victory in Great Britain will have many ramifications, but these three will be of most immediate interest to the Western World's metalworking industry:

The trend in the free world to greater nationalization of industry will be checked, temporarily at least; the Schuman plan, a proposal to pool Europe's steel and coal resources, will be viewed more sympathetically by a Britain that under the Laborites turned the scheme down; a more internationally minded British government may give more support to the International Materials Conference that's seeking to calm the Western World's scramble for scarce commodities.

Turn-About—The British Conservatives are pledged to restore the United Kingdom iron and steel industry to private ownership. All the other nationalized industries—the Bank of England, coal, railroads and road transport, gas and electricity, civil aviation and overseas communications—will probably remain in public control.

Carrying out the job of denationalizing British steel won't be easy, but it can be done. The socializing process has been going on since last Feb. 15 when the government-owned British Iron & Steel Corp. took over 80 major iron and steel companies and their 150 subsidiaries that accounted for 91.8 per cent of the production of iron ore, pig iron, ingots and hot-rolled products.

Company names have remained unchanged; past trade relations are about the same; and only in a few cases has the management at plant levels been modified. Socialization thus far has been largely financial, and the problem of the Conservatives will be to sell back to private owners the stock shares confiscated.

A similar situation would exist in the U. S. if Bethlehem Steel Co., second largest American producer with a capacity about equal to that of all the 80 nationalized companies, had had a complete transfer of all its stock last February in a deal that is now ruled void by court order. The retransfer problems would be tremendous but they could be managed somehow.

New Life—More than 18 months ago, France proposed the Schuman plan to pool Europe's steel and coal resources. Tortuous maneuvers to put the plan in practical operation are still going on, notably in France and West Germany. The British Laborites flatly refused to participate and thus weakened the plan's chances for ultimate success.

That state of affairs may all be changed now. The British Conservatives may not join in the scheme 100 per cent, but they are certain to be more favorable to it and will thus give the proposal a more favorable climate in which to begin functioning. Mr. Churchill has many times voiced his enthusiastic support of the pool plan.

Possible Help — A third area in which the Conservatives may bring immediate help to metalworking all over the free world is in the matter of strategic materials. About a year ago the International Materials Conference was formed to stabilize the world market for scarce commodities.

It experienced indifferent success, partly because the U.K. and U.S. have been at loggerheads part of the time on buying policies. The Churchill government may come to greater accord with the Truman administration.

Last December, the free countries were about to commit economic suicide after six months of frenzied world buying. Messrs. Truman and Attlee decided on collective action. The halt was needed because competitive buying had more than doubled rubber and tin prices. Most nonferrous metals had tripled in cost and some of them, like wolfram, had gone up fivefold.

Some Accomplished — Since its formation last January, the conference has made some headway. It assembled the first composite picture of the world supply and demand for scarce materials. It was able to allocate available supplies of copper, lead, zinc, sulphur, tungsten, molybdenum, nickel and cobalt. Some price ceilings were established, but no overall price agreements have been decided upon by the 27 member governments of the group.

That is the problem which greater internationalism on the part of the British may help solve.

Operation Turnabout: Denationalizing British Steel

Belgian Economy Gains

Employment in Belgian metalworking plants of the Fabrimetal group is now at about 169,000, about 8,000 more than in the first three months of 1951, but still a little below the 1948 figure. But production is on a par with the 1948 performance. Belgian exports of metal products are running at about 75 per cent of that produced for home use.

That export situation is being taken advantage of by the Belgian government taxwise. A 5 per cent tax has been slapped on all exports to countries which are members of the European Payments Union. The purpose is to pay off the Belgian debt to the EPU.

ENOUGH ORE IS PILING UP FOR WINTER STOCKS
. . . lake carriers now run a race with the weather

Near-Record Season Within Easy Reach

Great Lakes iron ore carriers are working against time and the weather to bring down 90-million tons plus from the Lake Superior region this season

THE RACE the Great Lakes iron ore carriers are running with the weather is coming into the home stretch.

Despite the constant question mark of the weather in iron ore movement, prospects are good that 90 million tons or more will be hauled this season from Mesabi to lower lake ports. As of last Monday, 81,771,970 tons had been moved from the lakehead. That's 8,228,030 tons short of the goal. Already the 1950 season's total of 78,205,681 tons has been passed.

Four Weeks Needed—At the rate of 2.4 million tons hauled a week, only four weeks of mild weather are needed to supply the tonnage now short. A good shipping season lasts until Dec. 10 or 15. Even if this is only a fair-to-middling season, and taking into account some bottoms being diverted to grain hauling, the 90-million ton goal should be attained by the time the winter freeze begins in the upper lakes.

All-rail shipments of iron ore will be continued this winter, chiefly by U. S. Steel. Several companies have been hauling ore through the summer months. It is estimated that more than 6 million tons of iron ore will be hauled in all seasons of 1951. In 1950 the total was 3,971,615 tons.

Stockpile Headache—One of the headaches being encountered by blast furnace operators is where to stockpile iron ore near the furnaces. Facilities for such stockpiling were laid out during prewar years when roughly 4.5 million tons of ore were used a month. Now the rate is more than 7 million tons a month, and there just isn't enough room to add that much to the stockpiles at the furnaces.

Latest available figures (Oct. 1) show 37,591,613 tons of iron ore stockpiled at the blast furnaces in this country and total stocks of 45,453,446 tons. Last year, as of Oct. 1, the stockpiles totaled 35,715,773.

More Capacity—Added to the Great Lakes carrier fleet so far this season are some 34,000 tons of carrying capacity. The *Cliffs Victory* and the *Leetsdale* account for 20,000 tons of this total and the *Tom M. Girdler*, which just made its maiden voyage two weeks ago, adds 14,000 tons.

While these carriers have helped the movement this season, the biggest single factor in attaining a 90-million ton haul is the length of the season. For example, the record-making year of 1942, when 92,097,781 tons were hauled, opened on Mar. 23 and ran until Dec. 17.

The 1951 season began on April 6 and the question is how long will it last.

Volume Up, Orders Down

Gray iron foundries will do $4 billion worth of business in 1951, but backlogs drop

GRAY IRON foundries will do $4 billion worth of business in 1951—two-thirds of the $6 billion volume which will be turned out by all the 3500 U. S. foundries this year—but new orders for gray iron castings have been shrinking lately in close proportion to production limitations on consumer goods.

That was the outlook which A. J. McDonald, chief, castings section of NPA's Iron & Steel Division, pictured at a Gray Iron Founders' Society meeting in Chicago. A record attendance of about 275 found the gathering ominously reminiscent of World War II, with government controls and shortages of materials casting long shadows across the agenda.

More Weight Needed—The foundrymen heard that there's constant demand for heavier castings, both steel and gray iron, weighing 300 pounds and up. Additional capacity for production in that range is needed. In discussing the situation for raw materials, most of which are scarce and growing tighter, Mr. McDonald mentioned that pig iron is a little easier to get. The decline in castings demand is partly responsible, as are the increase in blast furnace capacity and rising pig iron imports. Total iron imports in 1950 were 784,000 tons but in the first six months of 1951, some 600,000 tons were brought in and a new record for pig iron imports will be established this year.

Mr. McDonald said that except for the Mississippi flood area it has not been necessary to put a directive on any ferrous foundry in connection with the defense program.

Officers for 1952—Three of the society's 1951 officers were re-elected for 1952. These were President E. L. Roth, Motor Castings Co., West Allis, Wis.; Vice President R. G. Schaefer, Schaefer-Goodnow Foundries Inc., Pittsburgh; and Treasurer H. J. Trenkamp, Ohio Foundry Co., Cleveland. H. P. Good, Textile Machine Works, Reading, Pa., is now secretary.

Walter L. Seelbach, president, Superior Foundry Inc., Cleveland, was awarded the society's Gold Medal Award for his contribution to the association and to the industry.

Testing Group Elects Heads

Noah A. Kahn, head metallurgist, New York Naval Shipyard, Brooklyn, N. Y., was elected president of the

Society for Non-Destructive Testing for 1951-52, succeeding W. E. Thomas, vice president, Magnaflux Corp., Chicago.

New vice president is Robert C. McMaster, supervisor, electrical engineering division, Battelle Memorial Institute, Columbus, O., and treasurer, Dr. Gerold H. Tenney, Scientific Laboratory, Los Alamos, N. Mex. Philip D. Johnson, 1109 Hinman Ave., Evanston, Ill., was re-elected secretary.

New directors include retiring president Thomas; G. B. Brewington, Lawrence Institute of Technology, Detroit; William Poehlman, A. O. Smith Corp., Milwaukee; and Charles F. Murray, Ansco, Philadelphia.

Construction Officers Named

R. D. Wood, chairman of the board, Mississippi Valley Structural Steel Co., Chicago, was re-elected president of American Institute of Steel Construction Inc. Abbett Post was named again as executive vice president.

Other officers elected were John E. Jackson, Pittsburgh-Des Moines Steel Company, Pittsburgh, first vice president; Earle V. Grover, Apex Steel Corporation, Ltd., Los Angeles, second vice president; James M. Straub, Fort Pitt Bridge Works, Pittsburgh, treasurer; and M. Harvey Smedley, New York City, secretary.

Lockheed Trains Own Engineers

A long-range engineer-training program, first of its kind in the aircraft industry, has been instituted by Lockheed Aircraft Corp., Burbank, Calif., as one answer to the shortage of engineers. From the program, Lockheed expects to draw engineering personnel for future technical management positions.

Company and union representatives spent more than a year in co-operative development of the program calling for job rotation, expanded on-the-job training, and company underwriting of half the tuition costs for outside courses. The program will be company-administered.

Prefabs Here to Stay

Production of factory-made homes during the first nine months of 1951 has matched the industry's output for the same period in 1950 despite a drop of 23 per cent in all new housing activity.

This performance in the face of tough competition from conventional builders proves that the industry is firmly established, John C. Taylor Jr. told a meeting of the Prefabricated Home Manufacturers' Institute in Minneapolis. He said further that the prefabricated home makers will establish new and better standards for the housing field.

Featured in the program of the institute in Minneapolis were panel discussions on ways of lowering costs by more efficient methods of producing, financing and distributing prefabricated homes.

Malleable on the March

Shipments this year will set a new record but shrinking auto market may dry up new orders

ONE-HUNDRED twenty-fifth anniversary of the American malleable iron industry will be commemorated this year by the highest output of castings in history.

Over 1 million tons of malleable castings will be shipped in 1951 from the 100 foundries comprising the industry. Best tonnage marks before this were 1948's 933,000 tons and last year's 920,600 tons. Output this year slumped in midsummer (as did industrial production generally) but snapped back in August to 90,000 tons and—according to preliminary reports—over 100,000 tons in both September and October.

MALLEABLE CASTINGS
. . . over 1 million tons in '51

Disquiet—This fast production pace is eating into backlog, but there's still substantial work ahead: About 250,000 tons in unfilled orders going into September, according to Census Bureau figures. Malleable founders say crest of the ordering wave was reached last spring, and that backlog will slide steadily downward from now on. Reason: Malleable's biggest customer, the auto industry, is hamstrung with limitations. As goes the auto field, so goes well over 50 per cent of malleable orders.

Deficit in auto orders isn't being made by war work, says the industry. True, truck assemblies are running high and the railroad freight car program takes a lot of malleable. But even these, plus military tank-automotive requirements, will never be high enough to fill the gap, say producers. That was the case in World War II; the industry almost floundered when the civilian auto industry was put in mothballs.

Hope—Pourers of malleable castings won't turn sour on their industry's future. It's too closely allied with the entire civilian economy, and that has by no means been boarded up by armament. Though skeptical of any kind of government control, industry men do admit that CPR 60, the castings pricing order, is generally fair and equitable. Employment in malleable foundries has been steady; a shortage of skilled molders is no worry for those producers who switched to mechanical molding machines. Deliveries of foundry equipment and machinery are slow, some companies complain. The industry is small enough—40,000 workers—that few labor troubles originate there. Malleable foundries are finding some raw materials easier to get. Pig iron shows most noticeable improvement.

A ray of hope for diversification of the industry's products is seen in the fact that small plants aren't letting down like the big ones that cater to one civilian field such as automobiles. Tonnage from these shops may not be so great but diversity of operations and maintenance of capacity production schedules seem to indicate that full steam can be kept up in the industry.

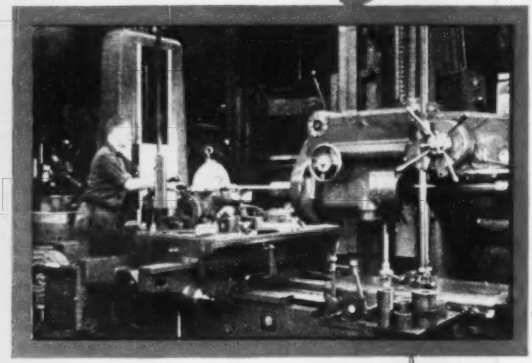
V-Loans Hit $1.2 Billion

As of Sept. 30, 1951—the end of the first year of the V-loan program—privately owned banks in the U. S. had received authorization for 729 guaranteed loans amounting to $1.2 billion to American industries engaged in defense work.

Under the program, the V-loans are guaranteed in various percentages of 50 per cent or more by the respective federal agencies authorized by Congress to make such guarantees. The Federal Reserve Banks act as fiscal agents of the U. S.

Fine Machine Work

"Decides the Quality of a Pump"



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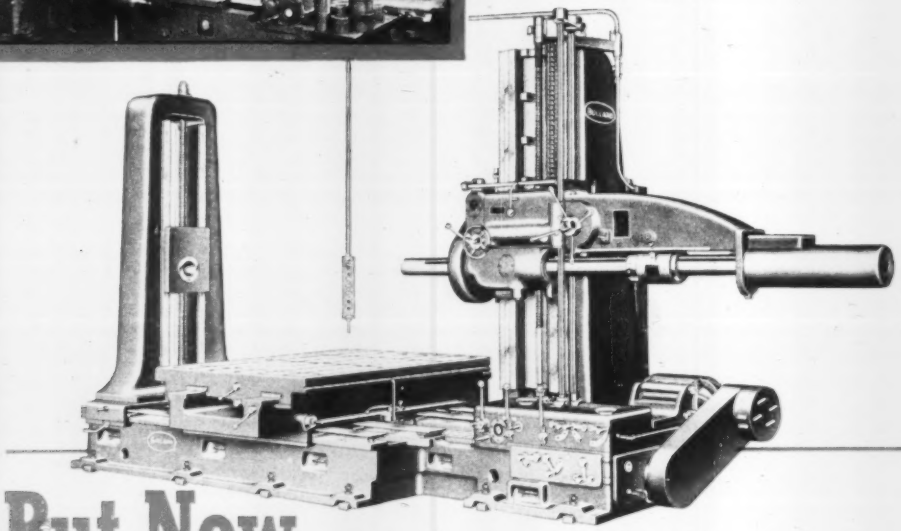

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By H. C. TUTTLE *Detroit Editor*

Mirrors of Motordom

Auto admen are having a tough time telling the public about "new" 1952 models for there's little new about them. Packard is the first to announce its entries

DETROIT

PUBLICISTS for the auto manufacturers have a tough job these days.

Their task is to tell and sell the public concerning the "new" 1952 models when there's not a great deal new about them.

The Cause Is Korea — The Korean War, of course, scrapped most of the tooling programs for new models. Automakers hope they can implement their postponed plans in 1953 units, but they're none too optimistic. A few makes, notably Kaiser and Packard, would not be expected to have major changes in their new models because of extensive revisions last year. The 1952 Packards were introduced yesterday and had only the anticipated style modifications, plus some mechanical innovations.

Several other makes have undergone the "facelifting" procedure several years running and will do so again although they will be approaching the limit for what stylists can do with the grille and other bright work to make the new models distinguishable from last year's counterpart.

A Few Are New — Only 1952 cars worthy of the adjective "new" as can be determined at this juncture are Ford, Mercury and Lincoln (new bodies), Ford 6 and Lincoln (new engines), Willys-Overland (entirely new car), and Nash (new body). DeSoto and Dodge are believed scheduling a change to V-8 engines sometime next year, but first offerings in the 1952 series will not have these power plants. Studebaker's body is expected to show reworking, and rear-end body changes are anticipated for the Oldsmobile "98."

Power steering is being pushed by every maker of heavy cars and some of those which are introduced without it may incorporate the device in later production. Power braking will be featured (see below) in several of the more powerful makes. Automatic transmission will have refinements.

Packard Features Power Brakes

The new Bendix power brake, making brake application almost as easy as stepping on the gas, is the major engineering feature of the new Packard line.

Called "Easamatic" by Packard, the power brake is offered on all 1952 models as optional equipment. Different in appearance from conventional brake systems, it has a treadle pivoted at the top instead of a pedal. Mounted only 4¾ inches from the floor board, compared with about 7¾ inches for the conventional brake pedal, the brake is applied by pivoting the toe from the gas to the brake treadle. Driver reaction "lag" between the time the decision is made to brake and actual application of the foot on the brake is cut an average of 29 per cent.

By Vacuum — Power for the brake is supplied by engine vacuum, working through a cylinder mounted under the toe board and directly connected with the treadle. When the engine is not running the brake operates exactly like a conventional hydraulic system. In normal operation a 40 per cent reduction in brake pedal pressure is effected.

Eight refinements have been put into Packard's ultramatic drive to give "improved and more positive operation."

About 85 per cent of next year's production will contain the device, according to present estimates. Primary innovation is a smaller direct drive clutch, said to give softer action, provide less drag and improve "kick-down" operation.

Woman's Touch—Mrs. Dorothy Draper, eminent woman decorator, played a leading role in interior and exterior restyling. Ten new exterior colors were developed for the car, most noteworthy of which is called "ebony gold," a jet black finish in which "suspended metallic pigment gives the effect of shimmering gold undertones."

The "200" series have been given a new grille and bumper treatment, special name plates adorn the "300" and "400" models. The rear-fender-mounted "louvers" have been changed in shape as one of the outstanding identifying features of the new car.

Materials Saved—Two examples, cited by Executive Vice President LeRoy Spencer, of how critical ma-

PACKARD'S HARDTOP MAYFAIR RESTYLED FOR 1952
. . . new brakes will be felt but not seen

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terials are being conserved in the new Packard are a smaller radiator core to save copper, a larger fan being used for adequate air circulation, and adoption of nylon for the speedometer gear to save brass.

Income Taxes Bite GM

What the new tax law does to an individual's paycheck is murder, but its effect on corporation net income is even worse. General Motors' third quarter financial report told the story bluntly. "Earnings on the common stock in the third quarter were about 33 cents per share less than they would have been if the increase in the taxes had not been made applicable to earnings for the first six months of the year," it read.

For each $1 of earnings available for dividends in the first nine months of 1951 the corporation set aside almost $2 for payment of income and excess profits taxes. The report said: "The corporation recognizes the need for substantial taxes to provide for national defense. On the other hand it must likewise be recognized that the capital needs of a business like General Motors must continue to be met."

Total corporation sales in third quarter at $1722 million were off 10 per cent from second quarter and were 14 per cent under the like quarter of 1950. Dollar sales for the first nine months at $5603 million were virtually the same as 1950's nine-month total of $5599 although physical volume was lower. United States car and truck sales for three quarters of 1951 was 2,250,989 units, compared with 1950's nine-month sales of 2,761,242 units.

Net income for third quarter was $93 million, contrasted with $218 million in third quarter 1950. For nine months of 1951 the corporation showed a net of $373 million, against $703 million for nine months of 1950. Responsible, the company said, was lower commercial volume, higher taxes, higher costs and lower profit margin on defense work. Net income for nine months amounted to 6.7 per cent of sales. The 1950 year's net income was 11.1 per cent of sales.

Defense work, the company says, is being pushed vigorously, but is not being readied in time to offset the decline in civilian production.

Almost half of the defense sales total for the nine months was achieved in third quarter when $209 million worth of military items were shipped. The nine-month total is $433 million.

Auto, Truck Output

U. S. and Canada

	1951	1950
January	645,688	609,879
February	658,918	505,593
March	802,737	610,680
April	680,281	585,705
May	695,898	732,161
June	653,682	897,853
Six Mos.	4,137,204	3,941,878
July	522,858	746,801
August	571,442	842,335
September	505,758	760,847
October	535,000*	796,010
November		833,784
December		671,622

Week Ended	1951	1950
Oct. 6	112,868	174,234
Oct. 13	120,543	174,234
Oct. 20	120,810	188,323
Oct. 27	121,338	188,230
Nov. 3	119,000*	177,096

Sources: Automotive Manufacturers Association, Ward's Automotive Reports. *Preliminary.

Ford Expands Its Steel Plant

One of the ten largest steel companies in the country, Ford Motor Co. is busy expanding its finished steel capacity at the Rouge mill by approximately 190,000 tons. Size of the program is best indicated by its cost—$50 million. Magnitude is pretty well obscured by the fact that most of the improvements are to existing mills, with relatively little new construction involved.

STEEL PRODUCTION AT FORD
. . . '51 production faster by 8 days

Most of the program is scheduled for completion by fall of next year. Only significant addition which will extend into 1953 is the installation of two batteries of soaking pits, work on which is being held off to prevent interference with production while other new ones are being built.

About 15 per cent of the project has been completed. Among the most important completed changes or new facilities are: Alterations to the 66-inch tandem cold mill, now equipped to handle coils up to 50,000 pounds, former limit was 30,000 pounds; entry end of the 84-inch temper mill has been enlarged to handle heavier coils; five of 16 new annealing furnaces; 13 of 41 new bases in the cold mill; No. 9 furnace in the open hearth shop has been converted from tilting to stationary type.

Scheduled for construction are 37 new coke ovens, a new coke screening plant, new sinter plant, installation of new pig casting equipment, other improvements. Two more of the new annealing furnaces and four bases in the cold mill will come in early this month. Nine furnaces and 24 bases are to be installed by April. The delivery end of the 84-inch temper mill will be rearranged next year. The new coke ovens, adding 205,000 tons to annual capacity, are expected to be completed by next June. Equipment in the coke by-products plant is being replaced. No. 10 furnace is being converted from tilting to stationary, completion due in July. A new 647-foot ore carrier is to be ready for the start of the 1953 shipping season.

While these changes go on, steel is being produced at a record level. By mid-October the mill had produced its millionth ingot ton, eight days earlier than the record set last year. At this rate, ingot output for the year should be about 30,000 tons greater than last year's 1,238,123 tons. Despite its production, Ford still must buy nearly 50 per cent of its steel requirements.

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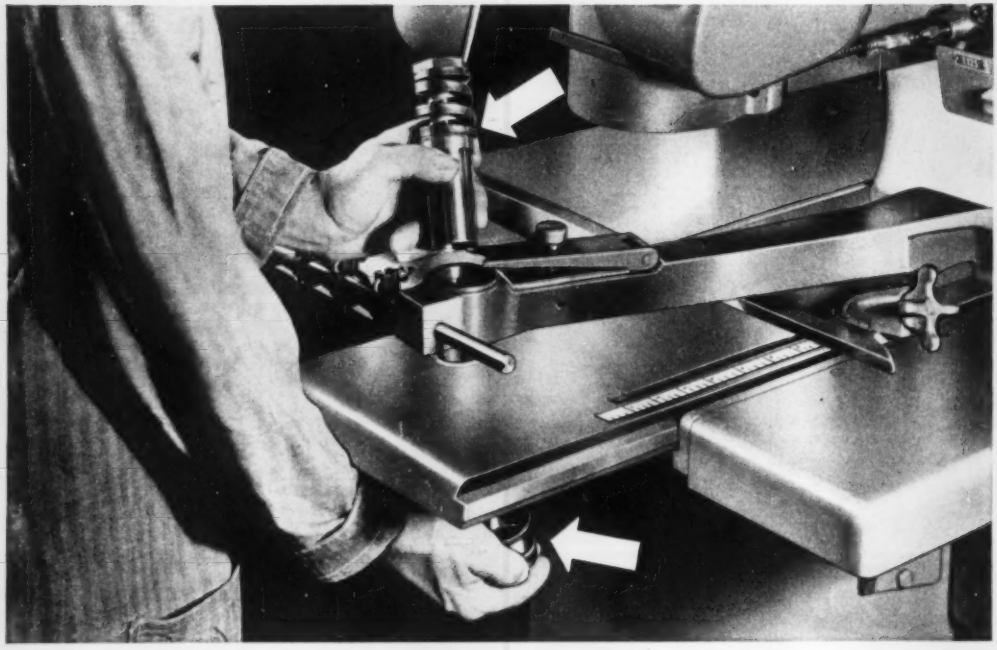
Houston 20, Texas

7251 General Motors Bldg.
Detroit, Michigan

403 W. Eighth Street
Los Angeles 14, Calif.

3104 Smith Tower
Seattle, Washington



Graph-Mo steel punches and dies cut both metal and wear

THE Wales Sheet Metal Fabricator above features "Quick Change" punches and dies made of Graph-Mo—a Timken® graphitic tool steel.

Several water and oil hardening tool steels were tested. Wales-Strippit engineers report that Graph-Mo was selected because "Graph-Mo punches provide long life with a minimum of galling—guides provide exceptional wear resistance".

Timken graphitic steels contain free graphite, along with diamond-hard carbides formed during heat treatment. This structure gives excellent resistance to wear and abrasion and faster, easier machining than other tool steels. Other advantages are superior non-seizing qualities, good stability, less tendency to scuff and score, and uniform response to heat treatment.

For information on the four Timken graphitic tool steels and their use in punches, dies, gages and machine parts, get the new 10th edition of "Timken Graphitic Steel Data Book". Write on your business letterhead to The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

Specialists in alloy steel—including hot rolled and cold finished alloy steel bars—a complete range of stainless, graphitic and standard tool analyses—and alloy and stainless seamless steel tubing.

The Business Trend

There's more optimism over the future because of the present industrial picture, although the business air hasn't cleared yet. Industrial activity index moves up

HOPEFUL atmosphere still pervades business despite numerous imponderables in the economic air.

Basis of this optimism is the current industrial picture. Transformation of the economy to a quasi-war footing has been remarkably smooth so far. Employment dislocations haven't been as painful as expected. While arms deliveries are gaining momentum, civilian goods are still in plentiful supply. Producers of them won't be completely strangled by the restrictions noose.

Soaring personal income from increased employment gives a corresponding lift to purchasing power. Much of this extra money is being siphoned off by tax increases. A lot of it goes into savings accounts, thereby retarding inflation. Consumers have the cash to buy more goods; they've merely lacked the inclination most of the year. Their buying desire, fanned by special promotions, is raising current retail volume about 10 per cent above last year. Bank loans to industry have risen steadily for two months. That's a good indication of business confidence.

Production activity is stronger too, as industry gnaws into heavy backlogs. Jump in steelworks operations in the week ended Oct. 27 caused STEEL's industrial production index to rise three points to 216 per cent of the 1936-1939 average. Noteworthy achievement in recent weeks has been volume of freight car loadings, highest in a year. Electric power output, 7,233,928,000 kilowatt hours in the week, set a new high.

Steel Pouring Record Set . . .

Not content with chalking up its 35th week of above capacity operations (out of 44), steelmakers in the week ended Nov. 3 were scheduled to produce the greatest amount of steel ever made in one week in the United States. American Iron & Steel Institute calculated yield of ingots and steel for castings to be 2,089,000 net tons. That would be 10,000 tons higher than the previous record week that ended Apr. 30. One year ago production was 1,975,000 tons.

Autos Are Coasting . . .

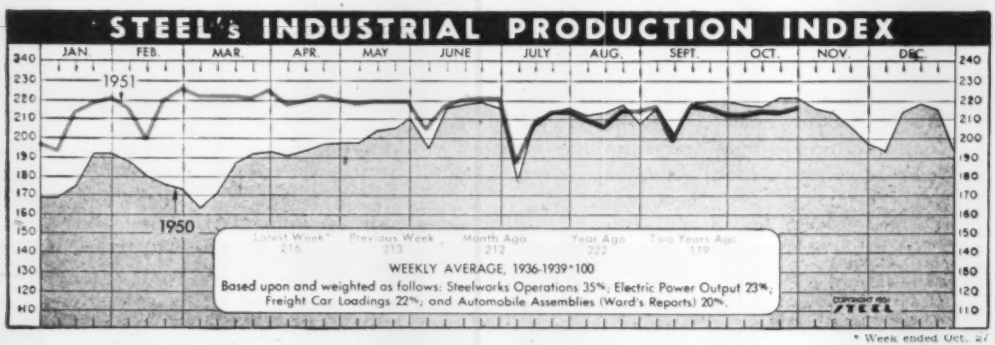
Third consecutive week of little change in car and truck output didn't reflect the threat of supplier strikes. In the week ended Oct. 27, 121,338 cars and trucks were built in U. S. and Canadian plants. *Ward's Automotive Reports* says industry output programs for October will be realized. Preliminary estimate for the month is 409,000 cars and 110,000 trucks. The figure for cars is about 37 per cent of the NPA-authorized production maximum for the fourth quarter. Gap between this and last year's passenger car assemblies has now been widened to the 1-million unit mark.

It Costs More To Live . . .

Slightly higher ceilings on pay scales regulated by the Wage and Salary Stabilization Boards will result from the rise in the cost-of-living index at mid-September. Bureau of Labor Statistics pegs its index for that

BAROMETERS of BUSINESS

		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	103.0	100.5	101.5	102.5
	Electric Power Distributed (million kilowatt hours)	7,234	7,149	7,102	6,563
	Bituminous Coal Production (daily av.—1000 tons)	1,897	1,828	1,817	1,971
	Petroleum Production (daily av.—1000 bbl)	6,350	6,353	6,303	5,895
	Construction Volume (ENR—Unit $1,000,000)	$189.1	$195.2	$335.1	$245.1
	Automobile and Truck Output (Ward's—number units)	121,338	120,810	113,973	188,230
	*Dates on request. †Weekly capacities, net tons: 1951, 1,999,035; 1st half 1950, 1,906,268; 2nd half 1950, 1,928,721.				
TRADE	Freight Car Loadings (unit—1000 cars)	880†	887	865	888
	Business Failures (Dun & Bradstreet, number)	155	157	154	160
	Currency in Circulation (in millions of dollars)‡	$28,301	$28,385	$28,137	$27,121
	Department Store Sales (changes from like wk. a yr. ago)‡	+10%	+5%	0%	+3%
	†Preliminary. ‡Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$17,004	$15,366	$17,125	$16,118
	Federal Gross Debt (billions)	$258.3	$257.0	$257.1	$256.9
	Bond Volume, NYSE (millions)	$16.2	$15.5	$13.2	$19.3
	Stocks Sales, NYSE (thousands of shares)	10,683	9,365	7,834	11,018
	Loans and Investments (billions)†	$71.5	$71.1	$71.6	$68.8
	United States Gov't. Obligations Held (millions)†	$30,976	$30,864	$31,333	$33,580
	†Member banks, Federal Reserve System.				
PRICES	STEEL's Weighted Finished Steel Price Index††	171.92	171.92	171.92	157.62
	STEEL's Nonferrous Metal Price Index‡	234.9	234.9	224.6	234.9
	All Commodities†	177.1	177.7	176.7	169.2
	Metal and Metal Products†	190.9	190.9	190.5	179.4
	†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100. ††1935-1939=100.				


STEEL's INDUSTRIAL PRODUCTION INDEX
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1951
1950
Latest Week* 216
Previous Week 213
Month Ago 212
Year Ago 222
Two Years Ago 119
WEEKLY AVERAGE, 1936-1939=100
Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.
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* Week ended Oct. 27

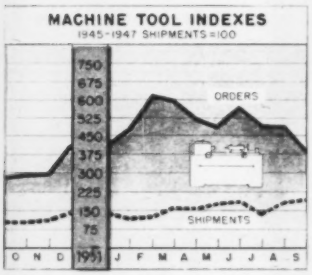
date at 186.6 (1935-39=100), a new high. It's now 9.6 per cent higher than pre-Korea and 6.9 per cent above September, 1950.

Buyers Less Wary . . .

Business is good and will continue so through November, says National Association of Purchasing Agents. Its business survey committee reports that December and first quarter 1952 conditions will depend upon: Movement of finished goods stocks by the holiday buying, allocation of first-quarter controlled materials for civilian uses, and rate at which defense orders can be brought into production in these months. Slight industrial business improvement that developed in September is being maintained, says the committee. Order backlogs are still slipping, but at a slower rate. Demand for holiday goods has picked up a bit, but not to the normal volume as much of it can be filled from stocks. Inventories were found to be declining all along the line — in raw materials, work-in-process and finished goods. Prices are tending to level off, but production materials prices have shown more strength in October than in any month since April. Buying policy has lengthened slightly, but is still on the conservative side.

Television Picture Unblurred . . .

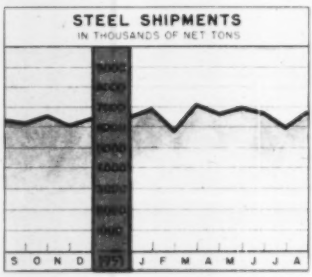
The television industry will build about 5 million sets next year—and sell every one of them. That's the majority opinion of set makers, who look for declining inventories of finished sets to further stimulate production. Production this year is estimated at between 5 million and 5.5 million sets, as against 7.5 million turned out in 1950. In the first nine months of this year, 3,970,857 TV sets were built, 21 per cent less than at that point last year. September output, 337,341 units, was nearly double August's. Radio production hasn't been hit nearly as hard. Nine-



Machine Tool Indexes

	New Orders 1951	New Orders 1950	Shipments 1951	Shipments 1950
Jan.	475.4	99.7	114.3	52.8
Feb.	615.5	89.2	123.8	56.1
Mar.	560.3	107.4	158.9	75.3
Apr.	516.1	98.9	157.7	61.6
May	483.0	116.4	175.1	82.5
June	558.8	124.1	182.8	91.9
July	490.6	253.1	144.7	68.2
Aug.	488.9	305.1	178.9	93.7
Sept.	380.2	280.6	189.8	101.6
Oct.		289.6		100.9
Nov.		291.9		110.9
Dec.		410.1		135.7

National Machine Tool Builders' Assn.

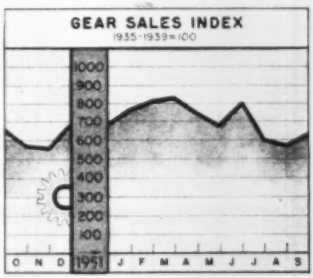


Steel Shipments

Net Tons

	1951	1950	1949
Jan.	6,904,688	5,482,691	5,788,632
Feb.	5,776,229	5,134,780	5,519,938
Mar.	7,105,078	5,723,340	6,305,681
Apr.	6,634,510	5,780,453	5,596,786
May	6,938,708	6,252,672	5,234,862
June	6,645,897	6,192,438	5,177,259
July	5,988,574	5,668,898	4,534,855
Aug.	6,755,589	6,326,464	4,918,314
Sept.		6,145,354	5,236,196
Oct.		6,503,531	935,037
Nov.		6,051,145	3,296,809
Dec.		6,432,776	5,410,902

American Iron & Steel Institute



Gear Sales Index

1935—1939=100

	1951	1950	1949
January	764.6	280.2	320.7
February	809.1	272.9	282.2
March	830.7	358.4	299.1
April	742.5	328.6	339.0
May	667.1	363.1	250.1
June	800.9	401.0	227.8
July	589.1	410.7	193.1
August	564.2	617.4	262.0
September	630.1	654.5	224.9
October		564.8	242.3
November		554.9	230.7
December		680.4	242.8

American Gear Mfrs. Association

Charts—Copyright 1951, STEEL

month radio figures show 10,077,478 completions, only 5 per cent below the same period last year. Output in September was 1,100,246 units.

Coal Demand Rising . . .

Marketers of coal appear to be ready to launch a full-scale campaign this winter to regain some of the customers lost to gas and oil competition. Export business (expected to reach 3.5 million tons in January) has been a strong prop under the coal industry this year. Domestic demand is rising, but stockpiles are high. Appalachian Coals Inc., marketing agency, predicts that demand through January will call for weekly production averaging 11,485,000 tons, well above current mining rates. Hopper car shortages are already hindering operations in some coal fields.

Less Time on the Job . . .

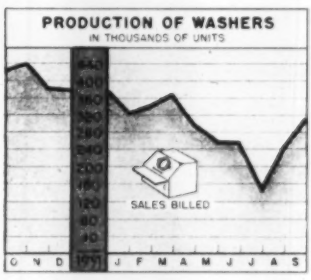
Factory workweek—averaging 40.5 hours in mid-September—was down a half hour from the same time a year ago, says Bureau of Labor Statistics. Plants making durable goods worked an average of 41.5 hours and those making nondurables worked 39.2 hours. Aircraft and metalworking machinery plants scored substantial gains. Weekly earnings have increased $1.65 since the wage stabilization order last January to an average of $65.29 in mid-September, up 73 cents from the preceding month.

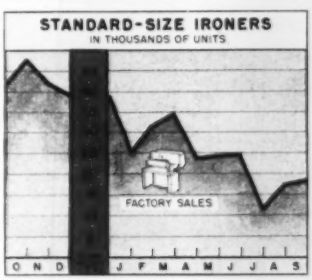
Trends Fore and Aft . . .

Little increase in consumer goods production was seen in October by the Federal Reserve Board . . . Only two of the 20 major classifications of steel consumers (autos and appliances) have received less steel this year than last . . . Ratio of unfilled orders to production rate in the machine tool industry was 23.6 to 1 for September . . . National income reached a seasonally adjusted annual rate of $274.3 billion in the second quarter, up $5 billion from the first . . . Wholesale prices dipped for the first time in a month in the week ended Oct. 23 . . . September bookings of fabricated structural steel dropped 11 per cent from August.

Issue Dates of other FACTS and FIGURES Published by STEEL:

Construction Oct.29	Furnaces, W. Air ..Sept.17	Ranges, Elec. Oct.25
Durable Goods Oct.8	Gray Iron Castings..Oct.22	Ranges, Gas Oct.25
Employ., Metalwk...Oct.8	Indus. Production ...Oct.1	Refrigerators Oct.1
Employ., Steel Oct.25	Malleable Castings ..Oct.22	Steel Castings Oct.22
Fab. Struc. Steel....Oct.15	Prices Oct.1	Steel Forgings Aug.20
Foundry Equip. Oct.15	Pumps, New Orders July9	Vacuum Cleaners ...Oct.25
Freight Cars Oct.23	Purchasing Power ..Oct.8	Wages, Metalwkg. ..Oct.22
Furnaces, Indus. ...Oct.15	Radio, TV Oct.15	Water Heaters Oct.1





Household Washers

Sales Billed—Units

	1951	1950	1949
Jan.	321,092	275,576	172,400
Feb.	341,328	342,967	201,300
Mar.	368,455	423,802	242,500
Apr.	292,193	333,072	192,500
May	253,942	304,640	211,700
June	253,119	325,217	260,700
July	139,779	282,261	200,900
Aug.	239,081	381,452	323,789
Sept.	313,746	424,043	357,281
Oct.	.....	439,924	333,728
Nov.	.....	379,964	298,717
Dec.	.....	377,013	237,591
Totals ...	.....	4,289,931	3,033,106

American Home Laundry Mfrs. Assoc.

Standard-Size Ironers

Factory Sales—Units

	1951	1950	1949
Jan.	24,600	20,300	28,300
Feb.	32,400	27,600	28,400
Mar.	34,700	37,800	23,800
Apr.	23,700	31,600	18,100
May	24,200	27,400	19,300
June	24,500	27,100	21,100
July	11,100	25,100	17,700
Aug.	17,200	42,700	32,300
Sept.	18,300	41,400	27,700
Oct.	.....	47,500	36,045
Nov.	.....	41,900	35,000
Dec.	.....	38,800	19,400
Total ...	.....	409,200	307,345

American Home Laundry Mfrs. Assoc.

LET'S TALK SPRING

(Flat rolled, annealed or tempered)

Whatever your spring steel requirements, in annealed or tempered, you'll find a wide variety of usual and unusual finishes at Kenilworth. And you can count on Kenilworth's cooperation in meeting your exacting requirements, too—certain of accuracy to specifications in order after order.

LET'S TALK SOURCE

Kenilworth's specialized spring steel department is well stocked with a wide selection of types, sizes and finishes. Quick handling of your order is assured—when you phone or wire there is no delay, current "in stock" inventory records make possible immediate response. Try us on your problem or requirement today.

LET'S TALK TO...

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SPECIALISTS IN FLAT ROLLED METAL PRODUCTS

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LET'S TALK ABOUT ALL OF KENILWORTH'S SERVICE

Custom slitting and shearing service for your metals to handle sizes from .001" to .187" in widths up to 36" is available — precision equipment assures minimum camber, minimum burr and closer than standard tolerances when required.

"NEW USE FOR FASTENER NETS *45% Savings*"

SAYS HAMILTON MANUFACTURING COMPANY, TWO RIVERS, WISCONSIN

Hamilton "takes the water" out of cost of assembling clothes dryer drums by adapting crating SPEED NUT to new use

When Hamilton engineers saw the heavy duty SPEED NUT designed for attaching products to crates, they got a real cost-cutting idea. Here was the perfect way to simplify the tie-rod assembly on their dryer drums. They could see that trading one fastener for three could lead to lower material costs, less inventory and parts handling, and greatly reduced assembly costs.

All this is confirmed by the Hamilton Standard Department Cost Reduction Report No. 11. *The SPEED NUT method provided a 45% assembly savings — or nearly $1,500 total annual savings on this application!*

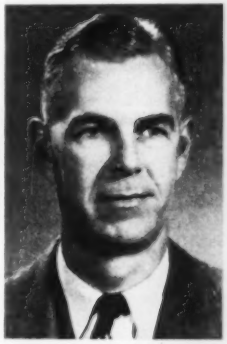
Recognizing that there are over 5,000 shapes and sizes of SPEED NUTS, you can see why Tinnerman engineers believe they can find a part to do *your* job. If the part doesn't exist... they will create one to meet your needs.

A Tinnerman Fastening Analysis costs nothing, yet can show you how to save plenty. Ask about this service and get your copy of Savings Stories. Volume II. TINNERMAN PRODUCTS, INC., Dept. 12, Box 6688, Cleveland, Ohio. In Canada: Dominion Fasteners, Ltd., Hamilton. In Great Britain: Simmonds Aerocessories, Ltd., Treforest, Wales.

BEFORE
AFTER
One-piece SPEED NUT replaces hex nut, lock washer and square washer. All fastening properties of 3 parts are incorporated in one. Tie-rods of dryer drum are held firmly in vibration-proof grip.
TINNERMAN Speed Nuts®
*Trade Mark Reg. U.S. Pat. Off.
FASTEST THING IN FASTENINGS*

Men of Industry

LEO P. PANTAS
. . . Stamford div. gen. mgr., Yale & Towne



KARL H. MEYER
. . . will manage Reliance's Ivanhoe Div.

JOHN P. ROCHE
. . . exec. V. P. at Heppenstall

Promotions in the management of locks and hardware manufacturing operations of **Yale & Towne Mfg. Co.** include: **Leo J. Pantas,** works manager of the Salem, Va., division, appointed general manager of the Stamford, Conn., division succeeding **Milo F. McCammon,** who resigned to accept a position with another company. **Marvin C. Bonine,** who joined the company as assistant to the works manager, Stamford Division, and director of its industrial relations department this past year, was named to succeed Mr. Pantas at Salem.

Edward T. Price was appointed general manager, **Cadillac Malleable Iron Co.,** Cadillac, Mich.

Copperweld Steel Co., Glassport, Pa., appointed **T. Y. Henry** division manager of its new subsidiary, **Flexo Wire Co.,** Oswego, N. Y. Before joining Copperweld he was manager, materials section, division standardizing, RCA Victor Division, Radio Corp. of America.

William H. Sisson was named power industry manager for **Minneapolis-Honeywell Regulator Co.,** with headquarters in Philadelphia. **George M. Rossiter** has transferred from the Milwaukee office to Indianapolis where he succeeds Mr. Sisson as industrial manager.

Arthur Williams was appointed production manager, **Pacific Airmotive Corp.,** Linden, N. J., division. **B. H. Atwater,** PAC's vice president-eastern division, was appointed vice president, sales and contracts, for the corporation with headquarters in Burbank, Calif.

Karl H. Meyer, who has been manager of the Ashtabula, O., plant of **Reliance Electric & Engineering Co.** since its completion in early 1947, will return to Cleveland Dec. 1 as manager of the company's Ivanhoe Division. He will be succeeded at Ashtabula by **Walter H. Haber,** former production manager of the plant.

Philip T. Sherman was appointed treasurer and comptroller, **E. Horton & Son Co.,** Windsor Locks, Conn.

E. H. Rocks, chief engineer, **Greene Mfg. Co.,** Racine, Wis., was promoted to vice president. He continues in charge of engineering the metalworking production of Greene, a subsidiary of Dumore Co.

Westinghouse Electric Corp., Pittsburgh, appointed **R. W. Bierwagen** staff assistant for manufacturing, industrial products division, and **F. R. Benedict** as assistant engineering manager, same division. Mr. Bierwagen was manager of the copper wire department, motor and control division, Buffalo, and Mr. Benedict for the past year directed engineering and research for the atomic power division.

Felix Wengerter was appointed district manager, New York branch office, **General Controls Co.** Glendale, Calif.

International Nickel Co. Inc., New York, transferred **R. B. Kropf** from its Cincinnati technical section to that in Detroit, where he will assist in the expanding defense activities. **C. T. Haller** succeeds to the Cincinnati post.

John P. Roche, vice president-general sales manager, was promoted to executive vice president of **Heppenstall Co.,** Pittsburgh. **Harry O. Lang,** vice president of the subsidiary company, Heppenstall Co., Detroit, succeeds Mr. Roche as vice president-sales of the parent company. **Raymond T. Porter,** eastern sales manager, succeeds Mr. Lang at Detroit, and **George H. Wurster** becomes eastern sales manager

Clearing Machine Corp., Chicago, elected **A. J. Wilhelm** vice president in charge of manufacturing. He has been with the company since it was founded. **Roy Prochnow** was appointed general superintendent of factory operations, and **Fred Pottberg** as master mechanic.

Metal & Thermit Corp., New York, appointed **Robert T. Brown** district manager at Pittsburgh to fill a vacancy left by resignation of **O. T. Barnett.** He has been district manager at Newark, N. J., and is succeeded there by **Nicholas Kiernan.**

Frederick Shultz was named chief engineer for all products manufactured in the Ilion, N. Y., plants of **Remington Rand Inc.**

Jack D. Moore was appointed plant superintendent at **Kaiser Aluminum & Chemical Corp.'s** Natividad, Calif., dolomite plant to replace **Walt Adams,** transferred to the company's Baton Rouge, La., alumina plant.

A. Milne & Co., New York, appointed **F. A. Bade** sales representative for Kentucky, with headquarters at Louisville, and **F. J. Grant** New Eng-

land sales manager, with headquarters at Boston.

M. T. Kinnison was appointed assistant purchasing agent of **Jas. P. Marsh**

M. T. KINNISON
. . . Jas. P. Marsh, asst. purchasing agent

Corp., Skokie, Ill., manufacturer of gages, thermometers, regulating and solenoid valves and heating specialties.

John J. Krez was elected vice president of **Janette Mfg. Co.**, Chicago. **Cleeman Withers** was elected vice president of the parent company, **Gerity-Michigan Corp.**

Axel Johnson was appointed chief draftsman of plant engineering in the maintenance and construction department of **Lukens Steel Co.**, Coatesville, Pa.

Billings & Spencer Co., Hartford, Conn., appointed **Leo A. Legat** sales representative for northern Ohio and western Pennsylvania, with headquarter in Parma, O.

Jeffrey Mfg. Co., Columbus, O., announces changes in the industrial sales organization: **Lincoln Kilbourne**, manager of sales, products engineering division, becomes manager of sales, conveyor division. **C. G. Hawley**, district manager, Jacksonville, Fla., office, replaces Mr. Kilbourne. **L. Cole**, sales engineer, Columbus, was named to replace Mr. Hawley. **Paul Lawall**, New York district manager, returns to Columbus as manager of sales, general engineering division, and is succeeded by **R. W. Sweitzer**, formerly Philadelphia district manager. **W. K. Myers**, Boston district manager, will be in charge at Philadelphia. **Paul Hendry** becomes Boston district manager.

S. E. Mueller was elected president of **Boston Electro Steel Casting Inc.**, Boston. He formerly served as vice president, general manager. Mr. Mueller was associated previously with Continental Foundry & Machine Co. and Falk Corp.

L. C. Cole was appointed director of sales of **National Motor Bearing Co.**, Los Angeles, to succeed **Park Q. Wray**, who continues as a director.

Norton Co., Worcester, Mass., appointed **K. F. Ebbeson** abrasive engineer to cover Arkansas, western Tennessee, Mississippi and Louisiana. He succeeds **David H. Paul. Richard J. Kervick** becomes abrasive engineer in West Virginia in addition to his duties as field engineer, Pittsburgh.

Harry J. Noles was appointed manager of the air filter division of

HARRY J. NOLES
. . . div. mgr. at American Air Filter

American Air Filter Co. Inc., Louisville, to succeed the late **Howard W. Pound.** Formerly assistant manager of the division, Mr. Noles joined the company in 1928.

W. J. Langston, president and general manager of **Canada Iron Foundries Ltd.**, Montreal, since 1942, was appointed chairman of the board. **T. F. Rahilly** was named president to succeed Mr. Langston.

General Electric Co., Schenectady, N. Y., appointed **J. R. Squires** manager of advertising and sales promotion, Atlantic district, apparatus sales division. He succeeds **R. H. Rensch**, who assumes new duties with the sales division. **Louis E. Newman** was appointed manager of marketing, large steam turbine and generator department; **A. W. Bartling**, manager of product sales practices, apparatus sales division; and **E. Chester Varnum**, production manager, small turbine and supercharger department, Fitchburg, Mass. **Bernard C. Tracey**, manager of accessories and renewal parts sales, welding department, retired Nov. 1 after 34 years of service.

Rochester, N. Y., Products Division, **General Motors Corp.**, promoted **Sylvester W. Aman** to factory manager. **John Armstrong** was named assistant factory manager. **Ernest Miles** succeeds Mr. Aman as production manager and **Leo Troy** becomes assistant production manager.

Walter Whetstone was named manager of the newly created Philadelphia sales office of **Black, Sivalls & Bryson Inc.**

Edward L. Dull was appointed Detroit district sales manager, **Mercer Tube & Mfg. Co.**

Julius H. Nill was appointed southern regional manager, **Metallizing Engineering Co. Inc.**, with offices in New Orleans.

Lawrence A. Curran was appointed head of **Bausch & Lomb Optical Co.'s** eyeglass lens plant at Midland, Canada.

E. Avery Williams was appointed general works superintendent of all plants and mines for **North American Refractories Co.**

Alfred H. Drewes was elected a vice president of **National Lead Co.**, New York. He became a member of the

ALFRED H. DREWES
. . . V. P. of National Lead

board of directors and the executive committee in October of last year. Since 1947 he has been assistant to the president. **Joseph J. Morsman Jr.** was named treasurer succeeding

SEND for this booklet on Vibration Control by Vibra-Mounts. It describes the new, simple, economical way to obtain up to 85% reduction in transmitted vibration, increasing plant efficiency, protecting machines, instruments, buildings and personnel. Vibra-Mounts can be installed quickly by superintendents and maintenance men.

American Felt Company
TRADE MARK

GENERAL OFFICES: 60 GLENVILLE ROAD, GLENVILLE, CONN. ENGINEERING AND RESEARCH LABORATORIES: Glenville, Conn.—PLANTS: Glenville, Conn.; Franklin, Mass.; Newburgh, N. Y.; Detroit, Mich.; Westerly, R. I.—SALES OFFICES: New York, Boston, Chicago, Detroit, Cleveland, Rochester, Philadelphia, St. Louis, Atlanta, Dallas, San Francisco, Los Angeles, Portland, Seattle, San Diego, Montreal.

STEVE A. GIRARD
. . . K-F vice president-operations

J. R. COFFING
. . . V.P. sales-adv. at Coffing Hoist

EMERSON G. HAMMACK
. . . Goodrich mgr., metal parts purchasing

Charles Simon, retired after 47 years of company service.

Steve A. Girard was appointed vice president in charge of operations, **Kaiser-Frazer Corp.,** Willow Run, Mich. With K-F since 1946, Mr. Girard has been assistant general manager for the past year.

John A. Rozos was appointed director of exports, **Dodge Mfg. Corp.,** Mishawaka, Ind.

William O. Reese, engineer, has joined the Houston technical staff of **Lamson Corp.**

James S. Wolff was appointed Washington representative of **B. F. Goodrich Chemical Co.,** Cleveland, to succeed **R. H. Williams,** assigned a new post.

Peter T. Hopper was named Pittsburgh district manager, and **James H. Sutherland,** field engineer, Pittsburgh district, for **SKF Industries Inc.**

Coffing Hoist Co., Danville, Ill., elected **J. R. Coffing** as vice president in charge of sales, advertising and general office administration. He has been general sales manager.

Edgcomb Steel Co., Philadelphia, elected **H. Lloyd Beyer Jr.** assistant treasurer.

Willard Storage Battery Co., Cleveland, appointed **Paul G. Gleason** manager of plant engineering, **Fred R. Kerns,** equipment engineer, and **V. G. Korfhage,** plant engineer.

Arnold E. Lange was appointed sales manager, **Carver Pump Co.,** Muscatine, Iowa. He formerly was sales manager, Mall Tool Co., Chicago.

J. S. Askey has joined **Elliott Co.,** Ridgway Division, Ridgway, Pa., as assistant works manager. He was superintendent of manufacture, transportation and generator division, Westinghouse Electric Corp.

Emerson G. Hammack was named manager of metal parts purchasing for **B. F. Goodrich Co.,** Akron. Succeeding him in his previous post as manager of engineering equipment purchasing is **Fred D. Stinaff. J. Terry Taylor** was named manager of Goodrich's track departments of the tire division, and **Delbert L. Crone** is production manager of these departments.

W. F. Vander Mass was named manager of the Grand Rapids, Mich., district office of **Allis-Chalmers Mfg. Co.'s** general machinery division. He succeeds **George C. Culver.**

Robert D. Winston was appointed sales-service manager, **Audio & Video Products Corp.,** New York. Prior to joining Audio & Video he was a sales engineer for Langevin Mfg. Corp. **W. H. Hazlett** was named eastern sales manager, and **K. B. Boothe,** manager of the instrumentation division.

OBITUARIES . . .

Walter P. Carroll, 59, vice president and director of **National Lead Co.,** and manager of the metal department, Chicago branch, died Oct. 20. He was associated with the company 41 years.

Thomas Gravell, 62, plant engineer for the **Hyatt Bearing Division,** General Motors Corp., died at his home in Millburn, N. J., Oct. 24.

William T. O'Connor, 62, retired vice president and general purchasing agent, **Manning, Maxwell & Moore Inc.,** died in Baldwin, L. I., Oct. 25. He retired in 1948.

Erik Oberg, 70, who resigned in 1946 as editor of *Machinery,* died Oct. 22. He was struck by an automobile while on a business trip in Rockford, Ill. Mr. Oberg was consulting editor.

Arthur W. Lyle, 67, sales manager, **Century Fence Co.,** Waukesha, Wis., died Oct. 19 at his summer home at Pell Lake, Wis.

Charles E. Coyle, 51, general traffic manager, **Otis Elevator Co.,** died Oct. 23 in Newark, N. J.

Charles A. Roberts, 61, president-general manager, **Western Foundry Ltd.,** Wingham, Ont., died Oct. 18 in Toronto.

Philip G. Mumford, 77, until retirement last spring head of **American Machine & Metals Inc.,** New York, died Oct. 28. He also was a director and former president of Commercial Solvents Corp.

Robert S. Hart, 72, president of **National Steel Car Corp. Ltd.,** Hamilton, Ont., died Oct. 20.

John T. Mascuch, 52, president of **Breeze Corp.,** Newark, N. J., manufacturer of airplane parts, died Oct. 26.

Jesse K. Baylis, 61, former sales manager at Buffalo of **Bethlehem Steel Co.,** died Oct. 25 in St. Petersburg, Fla. He retired in 1949.

Walter N. Larke, 62, assistant general manufacturing manager, **Buick Motor Division,** General Motors Corp., Flint, Mich., died Oct. 24 of a heart attack.

CUT COSTS

with the Original Mead

MIDGET AIR CLAMP

(Spring Return Air Cylinder)

In assembly jigs and other multiple applications, this new, low cost pressure unit saves countless man-hours. As a work-ejector in many fixtures, it is unexcelled.

Advantages over mechanical clamps

1 **All Air Clamps** in any set-up can be operated by a single master valve—the "lock-up" and release of assemblies is instantaneous.

2 **May be installed in cramped corners** difficult to reach with bulky mechanical clamps. Mead Midget is the most compact air cylinder, for its power, on the market.

3 **Equal ram pressure at any point** along stroke, making special, delicate adjustments unnecessary.

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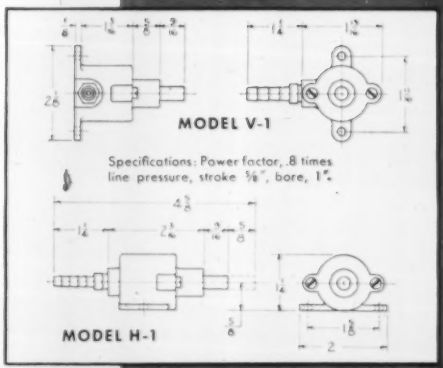

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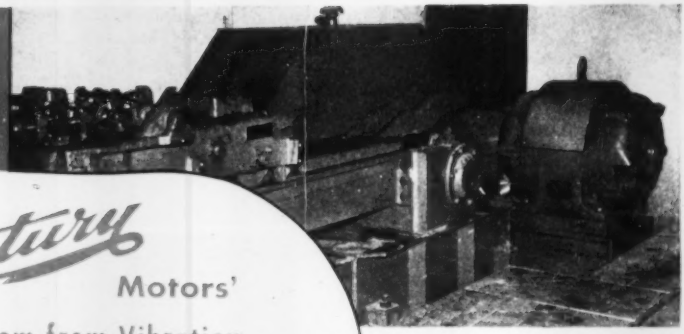

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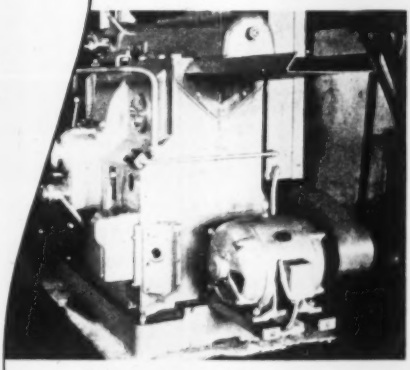
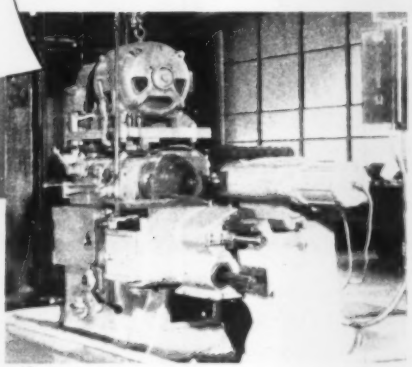
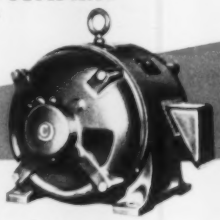


7½ Horsepower Century drip proof motor on a crank shaper in a tool room.



7½ Horsepower Century drip proof motor on a special production lathe.



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Production AND Engineering NEWS AT A GLANCE

VALVE EXPANSION CONTROLLED—Method of using heat-resisting steels for engine valves without allowing the high heat-expansion rate of such materials to affect the tappet clearance was recently patented in England. Head of the valve is made of a high nickel-chrome steel while the stem is a low-expansion steel. By this means, sum of the two expansions can be made to approximate that of the cylinder material.

SONIC-FLOW PYROMETER— Evaluating performance of gas turbines and jet engines poses some tough problems in determining temperature of the working medium. Troublesome source of error in most temperature-measuring instruments is the directed motion of the gas and loss of heat to the surroundings by radiation and conduction. An instrument reported to be relatively free of these errors is the sonic-flow pyrometer, so-called because the measuring element is located in the throat of a nozzle through which the gas whose temperature is to be measured, is caused to flow at sonic velocity. Total temperature of the gas is obtained by multiplying the temperature indicated by the measuring element by an essentially constant correction factor. The unit is still in the experimental stage.

STAINLESS POWDER-CUTS EASILY—By adding iron powder to the oxygen atmosphere, problem of fluxing and removing refractory oxide formed during powder cutting of stainless steel is solved. Chromium is the headache in straight oxygen cutting. When chromium-bearing steels are oxidized, a tough oxide is formed which prevents further oxidation. Consequently, it has been impossible to apply oxygen cutting techniques to steels containing more than 10 per cent chromium. Iron powder serves two purposes: Exothermic reaction of iron powder and oxygen keeps the chromium oxide fluid. The molten iron oxide formed fluxes the chromium oxide so it can be blown away from the surface, exposing fresh unoxidized surfaces to the oxygen stream. p. 94

LONGER CUTTING LIFE— Cutting life between sharpenings of all types of high speed cutting tools used on an aircraft production line is being extended greatly by "electrolizing" the tools. The electrolizing process combines high voltage with a chemical bath to produce an extremely hard, thin, evenly-deposited case on the cutting edges or wearing surfaces of tools and other parts. The internal structure, grain structure, shape and surface finish of the tool are not affected by the treatment. Treated tools are highly corrosion-resistant; tests indicate that 0.0001-inch of electrolizing provides corrosion resistance greater than 0.005-inch of hard chrome. One company reports that by using electrolized taper taps, production increased from 75 holes per tap to over 425 holes—a neat increase of nearly 600 per cent.

ALUMINUM CONTAINERS—Cans and other containers made of aluminum may be destined to play an important role in the conservation of tin and steel. A pilot plant machine is being developed to produce automatically a 1-quart aluminum can body. The body is made by winding a strip of aluminum foil into two or more layers, giving a total metal thickness sufficient for the structural requirements of the can wall. The strip can be printed with any label. A layer of thermoplastic material is applied to the inside surface to give a thoroughly bonded structure by heat sealing. p. 97

WELDABILITY GOOD—Welding techniques and mechanical properties of welded joints for Inconel "W" sheet material, an age-hardenable nickel alloy are currently under close study. The alloy is suitable for high strength, high temperature applications, including gas turbines. Special emphasis is on the development of resistance welding settings, on the testing of various arc welding electrodes and on the effects of heat treatment on welded joints. p. 99

KEEP 'EM DRY—Norton Co. emphasizes the importance of storing grinding wheels in a dry area in rooms not subject to extreme changes in temperature. Dampness and temperature changes may seriously affect some bond types. Locate storage racks where there is no danger from passing trucks or crane loads. Build racks, bins or drawers to accommodate each of the various types of wheels stored, strong enough to carry the loads. And be sure to construct each rack section so the wheels won't roll off.

CALIFORNIA NOTE—A transparent plastic window coating called Infropake is said to absorb the infrared and ultraviolet rays of the sun, cooling the interior of buildings while freely transmitting glareless light. Applied directly to the inside of glass window panes, the material is supposed to give constant and permanent protection.

PURE BORIDES—Borides of 99 per cent purity made from pure boron combined with other pure elements are now obtainable in commercial quantities. These borides are useful for development work involving high melting points. Zirconium boride, for instance, melts at about 3000° C. Other properties: Hardness (zirconium boride has a Knoop hardness of around 2710); thermal conductivity considerably higher than any of the carbides; resistance to oxidation at elevated temperatures.

Metalworking Outlook—p. 57 Market Outlook—p. 161

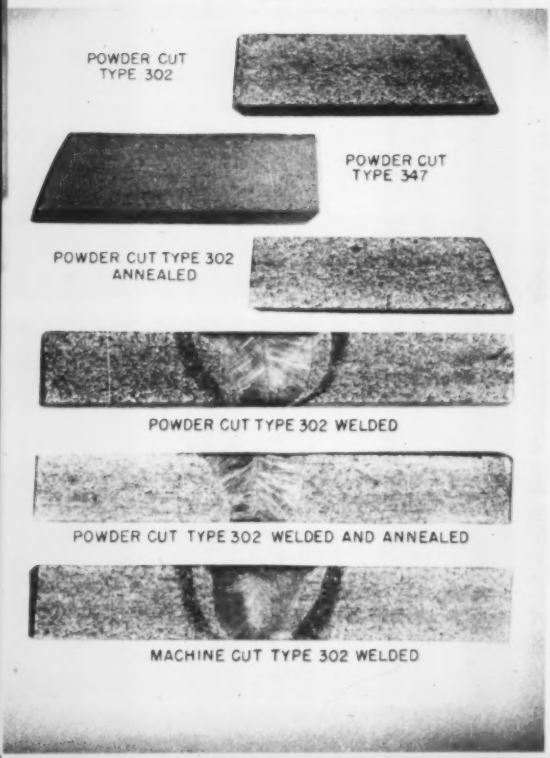
Powder Cutting

Handles Stainless with Ease

Problem of fluxing and removing the refractory oxide formed in cutting chromium-bearing steels is solved by adding iron powder to the oxygen atmosphere. Other applications of powder cutting are in nonferrous metals, cast iron and getting flying starts on carbon steel rounds

Powder is delivered from the pressurized hopper to a rapidly vibrating trough and accurately distributed into air stream

Below—Effects of powder cutting and welding on stainless steel


POWDER CUT TYPE 302
POWDER CUT TYPE 347
POWDER CUT TYPE 302 ANNEALED
POWDER CUT TYPE 302 WELDED
POWDER CUT TYPE 302 WELDED AND ANNEALED
MACHINE CUT TYPE 302 WELDED

FACTORS which enhance stainless steel's properties increase the difficulty of making it into usable forms. For example, chromium is added to steel to increase resistance to all forms of oxidation. By so doing, it has been impossible to apply the oxygen cutting techniques to chromium steel containing more than about 10 per cent chromium. Recognizing this disadvantage, the problems of fabricating stainless steels have been studied for many years. Among these, one of the foremost was to develop methods for sizing and otherwise shaping stainless steel plate, ingots and billets.

Early in the 40s, it was discovered that powdered ferromanganese additions to a high-purity oxygen stream produced an exothermic reaction permitting rapid oxidation of high chromium stainless steels. Later, suitable means were devised to feed powdered ferromanganese to the cutting zone of an ordinary oxygen cutting flame, thereby making it possible to cut stainless steel. Even in this crude form the process was almost immediately christened powder cutting. A large amount of development work followed, and this work resulted in powders without the drawbacks of ferromanganese. Eventually an iron powder compositon was standardized. Concurrently, equipment for the process was also developed and standardized. As the development proceeded, it became apparent that it could be useful for many purposes other than the cutting of stainless steel.

Apparatus requirements for powder cutting and scarfing comprise a cutting blowpipe, with a supply of oxygen and fuel gas and a powder dispensing device. With the exception of the powder dispenser, all of the equipment is of standard commercial design and the powder dispensing equipment has been so constructed that it can be easily added to standard cutting and scarfing torches. The powder system consists of a dispenser, suitable flexible tubing for conveying the powder to the blowpipe, a nozzle for projecting the powder into the reaction zone and a compressed air supply to operate the dispenser.

Powder Dispensers—Two types of dispensers are in general use—the pneumatic and the vibrating. The peumatic type is most often used for general purpose applications. It is considerably lower in cost than

Scarfing the edge of stainless steel billet. External powder feed tube is attached to blowpipe in this operation although most scarfing operations use the interior-fed nozzle

the vibratory dispenser but has sufficient range of operation to insure great flexibility. In the pneumatic dispenser, the powder is contained in a pressurized hopper from whence it is fed through a rubber hose to the blowpipe.

Vibratory dispensers are used where greater precision of powder flow is required. Powder is delivered from a pressurized hopper to a rapidly vibrating trough which distributes the powder at an accurately controlled rate into an air stream where it is picked up and delivered through a hose to the blowpipe. The powder can be delivered to the reaction zone either through an exterior nozzle attachment or suitable passages inside the blowpipe head and nozzle. Many cutting applications are handled by an exterior-fed nozzle, whereas most scarfing applications utilize the interior-fed type of nozzle. Special powder blowpipes have been designed for specific high-volume uses, such as cutting risers and hand scarfing but in most cases standard oxygen cutting equipment has been adapted to the powder processes.

Cutting Chemistry—When chromium-bearing steels are oxidized, a refractory chromium oxide is formed which prevents further oxidation. The problem of fluxing and removing this refractory oxide has been solved by adding iron powder to the oxygen atmosphere. Iron powder performs two functions: Exothermic reaction of iron powder and oxygen keeps the chromium oxide fluid and the molten iron oxide so formed serves to flux the chromium oxide so that it may be blown away from the surface, thus exposing fresh unoxidized surfaces to the action of the oxygen stream and permitting a continuous reaction to take place. The process produces a dense smoke consisting mainly of iron oxide. This smoke is not in itself toxic but provision should be made to remove these fumes by means of adequate ventilation to avoid operator discomfort.

On a machine-type oxygen cutting blowpipe, a powder valve controls the flow of powder through the tube to the dispensing nozzle. The powder is conveyed down through the tubing and blown out through the powder ports. In this equipment, six equally-spaced powder ports are located on a circle visible outside of the preheat orifices. The powder passes through the preheat flames where it is ignited and is then blown into the cutting oxygen stream proper. Air is the conveying gas generally used to convey the powder. Experiments using pure oxygen indicate no marked increase in the cutting efficiency.

For straight-line cutting, a more simple, single-orifice type of powder unit has been developed. The single tube can supply a heavier powder flow than the standard multiple-orifice type unit. This is especially suitable for cutting heavy sections of nonferrous materials such as nickel-base or copper alloys.

For powder-scarfing, an internally-fed nozzle is generally used. The dispensing procedure is identical except that the powder is injected into the oxygen stream within the nozzle. The powder becomes thoroughly mixed with the scarfing oxygen and is available for reaction at the scarfing zone.

Torch Positions—To develop the maximum heat from the burning powder, it is generally necessary to carry the cutting torch about 1 to 1½ inches above the work. Scarfing is generally done with the torch held about 2½ inches away from the work surface. Otherwise, the procedures and speeds are similar to those used with ordinary oxygen cutting. In powder cutting, generally an increased quantity of oxygen

Based on a paper prepared by A. B. Kinzel, D. Swan, H. Biers and H. R. Pufahl of Union Carbide & Carbon Corp., New York, and presented before the International Institute of Welding at Oxford, England.

must be supplied so that there will be sufficient oxygen to oxidize the powder as well as to maintain the cutting action. To do this, it is necessary either to increase the cutting oxygen pressure or to use the next larger size of cutting nozzle compared with that used for carbon steel of identical thickness.

Powder flow is a function of the size of the section and the oxidation resistance of the material. For ordinary gages of stainless steel, a flow of about 15 pounds of powder per hour is generally sufficient, although on very heavy cuts and with nonferrous material it has been necessary to go to flow rates as high as 100 pounds per hour.

Effects on Corrosion—If stainless steel is suitable for service in the as-welded condition, it will be equally suitable in the as-powder-cut condition. Heat effects of the powder cutting operation are similar but slightly less severe than those associated with fusion welding. These heat effects are not additive and if the powder cutting is followed by welding, the final heat-affected zone is no larger than that produced by welding alone. Full corrosion resistance may be restored by proper annealing of the weldment following cutting and welding, or by using columbium or titanium stabilized stainless steels.

All of the applications possible in cutting, scarfing, etc., plain carbon steels are equally applicable to stainless steel using the powder processes. These include shape-cutting, stack-cutting, plate-edge preparation for welding, gouging and scarfing.

Wide applications of the powder process have been made in stainless steel, mild steel and ordinary gray-iron foundries. The process is especially useful for riser cutting, pad washing, sand washing and defect removal for repair welding.

Nonferrous Applications — Powder cutting has achieved considerable success in nonferrous use. In some cases it has been necessary to add aluminum powder to the standard iron powder to produce a more reactive mix. Ten to 30 per cent aluminum, by weight, is usually sufficient. Applications include copper, nickel, brass, bronze, magnesium, aluminum, the Hastelloy alloys, Inconel, and Monel, as well as refractory materials such as concrete and firebrick. It should be pointed out that in these cases it is not generally possible to utilize a true oxidation reaction and to produce the same high quality cut possible in stainless steels. Rather, the exothermic oxidation reaction of the burning powder mixture produces sufficient heat to cause local melting in the material to be severed. Appreciable savings over other methods are shown in removing fused refractory material.

Cost of removing this 16-foot diameter cast iron flywheel was $150. Six cuts severed the rim at 20 minutes per cut and spokes took about 6 minutes per cut

In steel mills, the process has largely replaced the oxygen lance for reducing hard-to-cut material to furnace charging size. Large ladle buttons are split prior to being charged into an open hearth. Formerly, this heavy material would have been discarded on the slag dump because of the costs involved.

Time Saver—Powder process enables flying starts to be made in ordinary carbon steels and greatly increases the ease of starting cuts on round stock. Once the cut is started, the powder flow may be stopped. Usually it is necessary to use only about an ounce of powder to start a cut. Considerable savings are realized by this feature of quick starting on both small and large sections. It is particularly valuable in cutting large rounds, in that it reduces the total time of cut. Ordinarily, a considerable length of time is spent in preheating the starting edge with the flames tangent to the surface. Where multiple blowpipes are used in parallel, powder scarfing prevents a cut from being lost due to inadequate preheating. In general, the flying-start technique permits greater mechanization of cutting equipment.

Conditioning of stainless steel ingots, blooms, billets and slabs is a very important application of the powder processes. Stainless steel ingots are characterized by relatively poor surface and are difficult to hot work because of the formation of checks and bursts at almost every surface defect. Because of this it has been customary to chip and grind a considerable surface of the billet prior to final hot working. Using specially designed powder scarfing equipment in place of the grinding regularly required has resulted not only in a higher standard for fully conditioned blooms and billets but also in considerable savings, especially in continuous production shops. The scarfing techniques are also valuable for removing deep seated defects where large sections must be gouged out. In many cases it was formerly so costly to grind these defects that the piece was generally scrapped and remelted rather than reclaimed.

Powder scarfing speeds are approximately 20 per cent of those obtained on carbon steels with normal oxyacetylene scarfing equipment. The powder flow varies from 40 to 75 pounds per hour, depending on the surface quality necessary. Very smooth surfaces suitable for final rolling to sheet are produced by using high powder flows. Lower powder flows are generally used in rough conditioning during the breakdown stages of the hot working process.

By G. W. BIRDSALL
Reynolds Metals Co.
Louisville

Aluminum Containers Stretch Tin Supply

Tin can protection without "tinplate" is afforded by several different types of packages which use aluminum alone or aluminum combined with paper, wax, plastic or fiber materials

FACED with a critical shortage in tin, it is again necessary for government and industry to concentrate on means for making our comparatively small supply of tin go as far as possible. That means using tin only where absolutely necessary. Enormous quantities of tin are used in coating steel sheets to make tinplate for so-called "tin" cans.

Aluminum Packages—Reynolds Metals Co. has developed a number of different types of packages which use aluminum to conserve not only tin but also the steel required when tin cans are used. In some of these packages, aluminum alone is used. In others, aluminum is combined with paper, wax, plastic or fiber materials to provide the kind of protection that is desired.

Fig. 1 shows the Reynolds can. For a size 2½ or regular 1 quart can, the body of the can is made by winding a strip of aluminum foil into two or more layers, giving a total metal thickness sufficient for the structural requirements in the can wall. This strip may be printed outside with any label desired and a layer of thermoplastic material applied to the inside surface sufficient to give a thoroughly bonded structure by heat sealing. The type and quantity of plastic used can also be varied depending upon the physical and chemical requirements of the product to be packaged.

In production, this strip is wound into a coil and heat applied to bond the structure. The coil is then removed from the form, top and bottom edges flanged to take standard top and bottom closures, which are crimped in place by conventional methods on standard machines like those that are used in production of tin cans.

Top and bottom members are also aluminum but in 0.010-inch material. The alloy and temper of aluminum for both body and ends is 3S-H14 (half-hard).

Gives Good Protection—The can offers just as much protection to its contents as does a conventional tin can. It is just as weatherproof and moisture-resistant. It can be used for almost every application where a tin can would serve. Primary advantage of the Reynolds can over other aluminum packages is that it is suitable for liquid products.

Due to the lower modulus of aluminum, it will not crimp as tightly, therefore the ends will not resist as much internal pressure. However, use of thicker end pieces will correct this condition wherever considerable internal pressure may be expected to develop, as in sterilizing or processing the can's contents at high temperatures.

Also temperatures must not exceed those that would damage the plastic heat seal between the layers of aluminum in the can wall.

A pilot plant machine is now being developed to produce automatically the can body. Production machines will be made available to can users on a rental basis, to be competitive with present can-making machinery handled on a rental basis. The can ends are

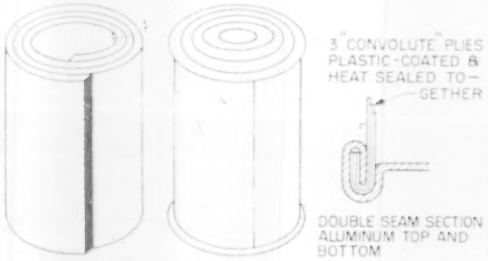


Fig. 1—Reynolds can. For a regular 1-quart can, body of can is made by winding a strip of aluminum foil into two or more layers, giving a total metal thickness sufficient for the structural requirements of the can wall

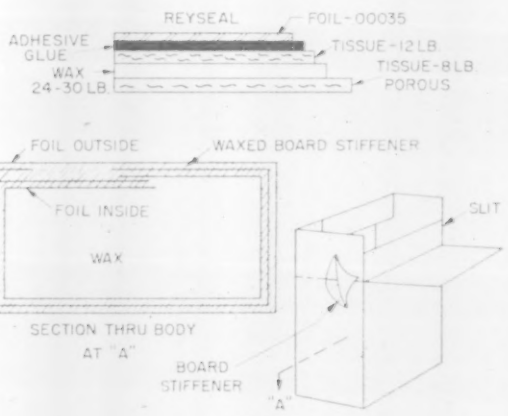


Fig. 2—Construction of a typical type of Reyseal. Manufacturing process is described in the text

made with conventional machinery already available. Likewise the ends are applied to the can body with conventional equipment now available.

Tests to determine internal pressures the can will withstand, crushing pressures it can resist, and the like are being made.

Many Uses Seen—The aluminum can is well suited to replace ordinary tin cans for any dry food product that does not need to be cooked, sterilized or otherwise processed in the can at high temperatures. This means the can is adaptable for an extremely wide range of food products. In addition to dry food products, certain other "wet" foods may also be packed in the Reynolds can, including corn syrup, olive oil, oleomargarine, butter, shortening, peanut butter, jam marmalade, jelly, and the like.

It will also give good service in shipping motor oil, antifreeze, grease, alcohol, cotton-seed oil, and certain pharmaceuticals. In many such applications, the high salvage value of the aluminum container will prove an added feature. Service stations, for example, can easily accumulate oil cans for salvage.

Fire control equipment, fuses, small instruments, electronic parts, electric meters, and many small items are "cushion packed". In this method, the part is wrapped loosely or "wadded" and then "stuffed" in the can. The wadding then takes up shocks when the package is dropped and so serves to cushion the part packaged. The can is ideal for this service. Any item sensitive to shock and corrosion will be well protected in this type package. Such products include parts for communication equipment, bearings, meters, relays and the like.

"Flexcan" Developed—Another package most nearly approaching the tin can is the new Flexcan. This package is best from the moisture resistance standpoint and offers protection fully equal to that of the tin can, except that it does not have the mechanical strength. However, many small items are packaged in small cans and these then packaged in larger cans. There is no reason why this new container cannot be used for smaller containers in many applications.

The package is made by successive wraps of special foil-paper materials, paper carton, and foil-paper overwrap . . . . all items impregnated with wax and wax-sealed together as the package is formed. Secret of the container is Reyseal, a new packaging material developed by Reynolds since the war.

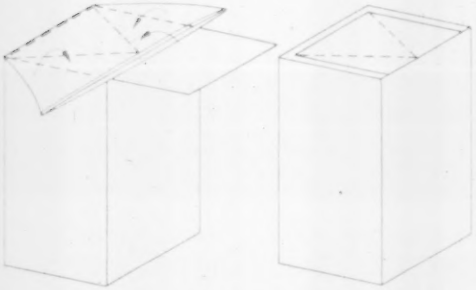


Fig. 3—Flexcan is a built-up laminated heat-sealing foil container 2¾ x 4 x 1-9/16 inches, consisting of a wax-impregnated chipboard carton with a Reyseal inner liner and outer wrap

Improved Packaging Material—Fig. 2 shows the construction of a typical type of Reyseal. This is how it is made: The foil is wet laminated to the 12-pound tissue with wax; then the 8-pound porous liner tissue is rolled on dry. The result is a sheet of aluminum foil 0.00035-inch thick (14.1 pounds per ream); a layer of wax applied at rate of 8 pounds per ream; a layer of 12-pounds per ream tissue paper; a layer of wax applied at rate of 24-32 pounds per ream; and a final layer of 8-pound per ream porous liner tissue.

The 12-pound tissue gives the material ample body; the 24-32 pound layer of wax provides enough wax to seal the package when heat is applied. The porous liner tissue gives a dry surface to speed closure and eliminate gumming up automatic packaging machines.

Heat-Sealed Back-to-Back—Heat sealing is quickly and easily done with this material as Reyseal can be firmly stuck liner-side-to-liner-side, or liner-side-to-metal. If the foil side is regarded as the face, this means sealing can be effected back-to-back, or back-to-face . . . . but not face-to-face. Sealing is accomplished by applying heat which causes the 24-32 pound layer of wax to melt and run through the porous liner and against the adjoining sheet.

The Flexcan consists of a wax-impregnated chipboard carton provided with a Reyseal inner liner and a Reyseal outer wrap. The container is made from three rolls of this material (Reyseal, chipboard, Reyseal) fed into a machine which produces the complete package, open at one end for filling.

After it is filled, it passes on to another machine which closes the unit.

The container offers moisture resistance fully equal to that of a tin can, yet it costs only about one-third as much. Since all materials in the wall of the package are wax impregnated, it offers a high rate of heat transmission which means the contents can be frozen quickly.

Contents are equally as well protected as when in a conventional can. Of course, the package does not have quite the mechanical strength of the can but that is a factor of small importance in many container applications.

Made on Special Machinery—The Flexcan is made on special automatic machinery, developed jointly by General Mills and Reynolds Metals. Negotiations are now under way to determine ultimate arrangements.

The Flexcan is made in one size at the present time, a rectangular package with an approximate capacity of 4 ounces. Machines to make other sizes will be developed. It is planned to make the machines available to potential users on a rental plan.

With the exception of the Reynolds can, the Flexcan is nearest the tin can from the moisture protection standpoint. It is an excellent package for all dry food products. In addition, it is well suited for packaging frozen fruit juices and frozen foods of all types. It is not recommended for packaging wet or vacuum-packed products.

By ALLAN J. ROSENBERG
Thomson Laboratory
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Lynn, Mass.

Welding Inconel "W" Sheet

This high strength, high temperature nickel-base alloy can be successfully welded by inert arc, metal arc and resistance welding processes. While a direct age is satisfactory for short time properties, annealing prior to aging increases 100-hour stress rupture values. For optimum resistance welding conditions, high unit pressures and slow weld cooling should be utilized. Filler material is advisable for best inert arc welded joint strengths

TRENDS in gas turbines are pointing up the need for materials which can maintain suitable mechanical properties over wide temperature ranges. One of the most promising high temperature alloys is Inconel "W", a high strength, high temperature alloy developed by International Nickel Co. for applications up to 1200° F.

The alloy depends on composition and heat treatment for its high strength, responding to age hardening to a degree that warrants its use in the high temperature range.

Inconel "X", a later development of International Nickel Co. has slightly improved mechanical properties through the addition of 1 per cent columbium, but the present shortage of that element makes the use of Inconel "X" slightly less desirable. As far as welding techniques are concerned, Inconel "W" and Inconel "X" may be considered as the same alloy. Both materials can be successfully resistance welded and metal or inert arc welded.

Spot Welding—All of the welding tests reported here were conducted originally for air force applications. Stringent requirements are laid down for resistance spot and seam weld strength, size and quality. In developing suitable resistance welding schedules the object was to attain defect-free welds of suitable size and strength.

Spot welding tests were conducted on unaged 1 x 4-inch coupons of 0.045, 0.062, and 0.094-inch Inconel "W" using conventional press-type equipment rated at 200 and 750 kva. Minimum and average strength and size requirements are listed in Table I. The figures in parentheses are requirements prior to aging.

Welds were cross-sectioned and etched to determine weld size and quality. Ultimate tensile shear strengths per spot were determined at room temperature, with several tests made at 1200° F.

Good Tensile Shear Results — Excellent tensile shear results could be obtained at several conventional weld settings using normal electrode forces, but under these conditions the material has a tendency

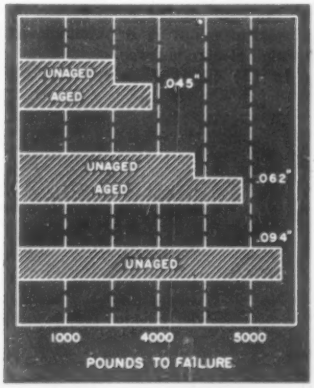


Fig. 4 — Tensile shear strengths of aged and unaged spot welds

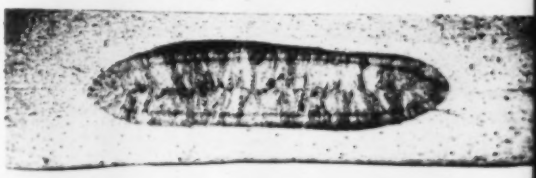
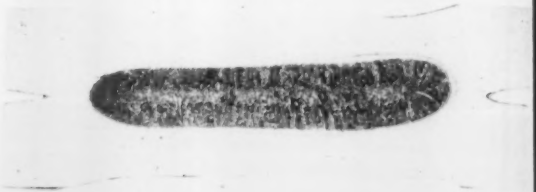


Fig. 1—Sound spot weld in 1/16-inch Inconel "W"

Fig. 2—Tensile shear sample failing in base metal with internal weld defect

Fig. 3 (below)—Sound spot weld made with flat-tipped electrodes. Note excessive indentation and plate separation



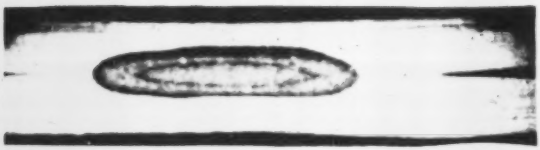


Fig. 5—Typical cross-section of spot weld in 0.045-inch material

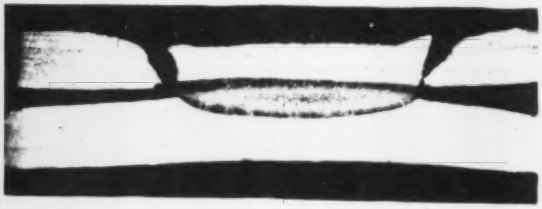


Fig. 6—Cross-section of typical parent metal failure in tensile shear tests

Fig. 7—Sound spot weld in 0.094-inch material. "Coring" at edge of weld is not a defect and is usually attributed to high electrode force

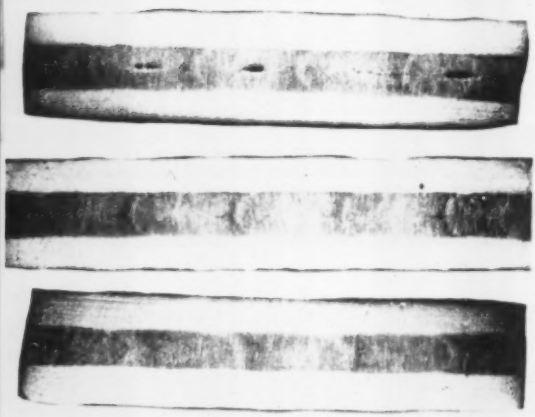


Fig. 8—Effect of force on seam welding: (top) 2200-pound force, large voids, (center) 2500-pound force, almost negligible voids, (bottom) 2700-pound force, sound seam weld

COMPOSITION OF INCONEL "W"

Ni	Cr	Ti	Al	C	Fe	Mn	Si	S	Cu
73.5	15.0	2.5	0.90	0.04	7.0	0.50	0.40	0.007	0.20

toward weld porosity or dendritic shrinkage. The defect was evident in both x-ray examination and in etched cross-sections.

Fig. 2 shows a tensile shear sample with an internal defect that failed by tearing the parent metal. While the defect had no noticeable effect on tensile shear strengths, a sound weld was required and additional tests were conducted.

The defect could be minimized by several methods: (1) Slow weld cooling, (2) high unit pressures or (3) a combination of both.

Slow weld cooling was accomplished by the use of a relatively low current over a long period of time, with as many as 48 weld pulsations. While such a setting did result in sound welds, the weld time became so prohibitively long that the setting was not practical.

Unit Pressures High—High unit pressures were obtained through the use of flat-tipped electrodes with chamfered sides. However, distortion was increased and plate separation became excessive. A sound weld made with flat-tipped electrodes is shown in Fig. 3; plate separation is apparent. Radius type electrodes were used in subsequent tests.

Most satisfactory solution for attaining sound welds was one in which advantage was taken of all contributing factors: Slow cool time and high unit pressures. Through the use of low conductivity electrodes, pulsation welding and high machine forces, both conditions were taken into account and sound welds were achieved.

Table II lists settings for the three thicknesses tested while Fig. 1 shows a cross-section of a sound weld in 0.062-inch stock with normal plate separation and indentation.

Excellent Etch Results—Under the conditions listed in Table II, etch and tensile shear results were excellent. Fig. 4 shows diagrammatically the ultimate tensile shear results obtained. In every case values were above the requirements of Table I.

Figs. 5 and 6 show typical cross-sections in 0.045-inch material, while Fig. 7 reveals a cross-section in 0.094-inch stock. Fig. 6 reveals a typical shear failure where parent metal tears. The "coring" noted at the edge of the weld in Fig. 7 does not represent a weakness but is a phenomenon usually attributed to high electrode force.

In the case of short time tensile shear results,

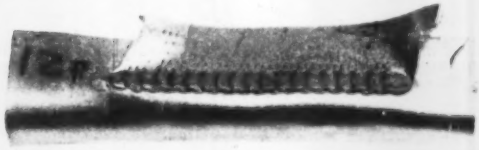


Fig. 9—Excellent peel results of seam weld made with 1½-inch radius faced wheels

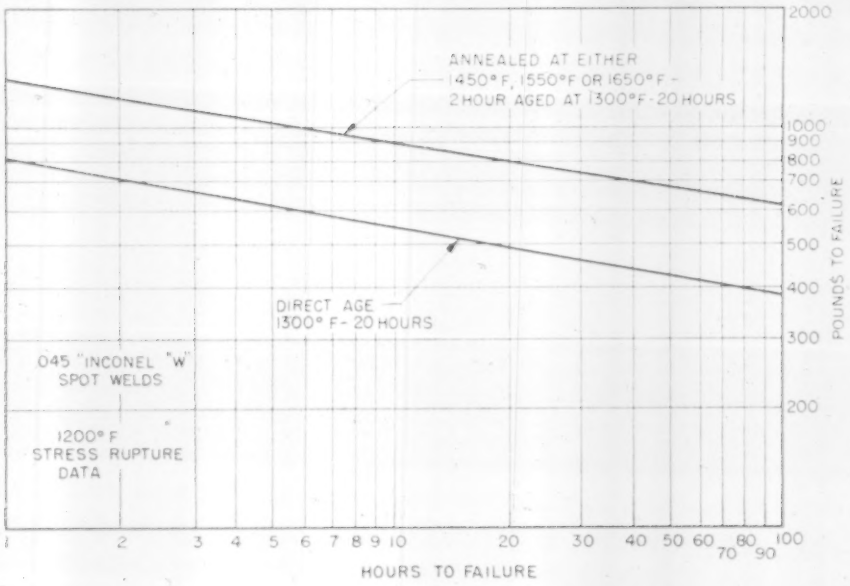


Fig. 10 — Stress rupture results at 1200 F for spot welds in 0.045-inch Inconel "W"

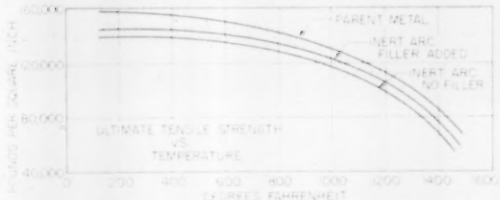
Fig. 11(below) — Short time tensile properties of inert arc welded Inconel "W" after direct aging

annealing prior to age-hardening had no effect and welds tested after four conditions of heat treatment* all failed at comparable strength value.

In the case of high temperature stress rupture results (for which no prior standards have been established) the curves of Fig. 10 indicate that there is a distinct advantage to annealing prior to aging, since an approximate 50 per cent increase in strength can be achieved by this treatment at the 100-hour point.

Seam Welding—As with spot welding, Inconel "W" has a tendency toward internal defects in the weld when seam welded. Since seam welding wheels are cooled by a stream of water directed at them and the material being welded, it is impossible to effect a slow cooling of the weld and advantage can only be taken of high electrode force. Seam welding tests were limited to 0.045-inch thicknesses of un-

* 1. Welded, aged at 1300° F—20 hours. 2. Welded, annealed 1450° F—2 hours, aged 1300° F—20 hours. 3. Welded, annealed 1550° F—2 hours, aged 1300° F—20 hours. 4. Welded, annealed 1650° F—2 hours, aged 1300° F—20 hours.



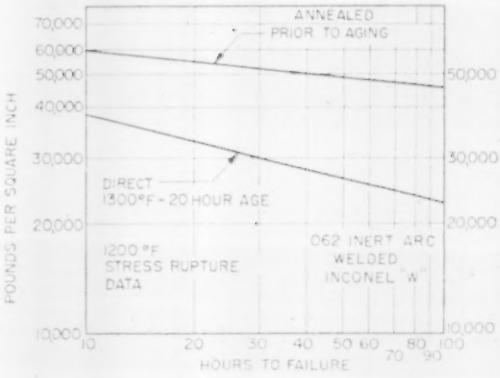


Fig. 12 (right, center) — Stress rupture results at 1200 F for inert arc welded Inconel "W"

Fig. 13 (right)—Short time tensile properties of metal arc welded Inconel "W" after direct aging

Fig. 14 (below)—Butt joint in 0.062-inch Inconel "W" inert arc welded with 1/16-inch bare Inconel "X" filler wire added

TABLE I

Material thickness	0.045"	0.062"	0.094"
Required average tensile shear force	2420 (1725)*	4010 (2740)*	7200 (4960)*
Minimum acceptable tensile shear force	2050 (1460)*	3400 (2320)*	6100 (4200)*
Average spot size (80% of sizes shown is an acceptable minimum)	.220	.250	.310

* Tensile shear forces for unaged material

TABLE II

Material thickness	0.045"	0.062"	0.094"
Machine force	2500 #	3400 #	4500 #
Time setting in cycles (on-off-pulsations)	20-5-10	20-10-10	20-15-10
Approximate current	8700	10,500	12,000
Electrode	RWMA Class III, 3" Radius		

aged Inconel "W" and were conducted with conventional equipment.

A positive indication of the advantage of increased force is shown in Fig. 8. At machine settings that were comparable in every way except the force used, welds showed quality improvements with increasing force.

At the time setting used, peel results were extremely poor and it became necessary to increase weld time to obtain satisfactory peels. This change necessitated an increase in unit pressures. Since 2700 pounds was the force limitation of the equipment available to the author, some other means of increasing unit pressures had to be found. Changing the normal 3-inch radius faced wheels to $1\frac{1}{2}$-inch radius faced wheels increased unit pressures and permitted sound and ductile welding. Using $1\frac{1}{2}$-inch radius faced wheels, a 2700-pound machine force and a 20-cycle on, 12-cycle off time setting the peel sample of Fig. 9 was obtained. Wheel speed was 14 inches per minute and current approximated 9600 amp.

Inert Arc Welding—The object of arc welding tests is to attain sound, ductile welds of suitable mechanical properties for the applications involved. Inert arc welds were made by fixturing 0.062-inch unaged Inconel "W" in suitable jigs and welding automatically along 6-inch butt joints. The joints were then sheared and cross-sectioned for macro examinations. In addition, weld face bends, short time tensile tests and stress rupture tests were conducted.

No difficulty was encountered in achieving sound, ductile welds with the process using direct current, argon gas for shielding, and metal backing. Welds tested on the as-welded or age-hardened condition bent a full 180 degrees without defects.

Where short time tensile values are concerned, direct aging after welding produces welds with strengths comparable to the base metal. Fig. 11 shows these values for parent metal and welds with and without filler material.

However, when stress rupture is considered, a direct age after welding results in welds of approximately half the aged parent metal strengths at 100 hours. Annealing at any of the temperatures used in the spot weld tests can increase these values considerably. The curves of Fig. 12 are of inert arc welded specimens that were ground flush prior to testing. Because of the usual indentation at the joint when no filler metal is added, the as-welded joint has lower strengths than those shown. Filler material should therefore be added to build up the joint and avoid a stress raising condition. Fig. 14 is a typical inert arc welded joint in Inconel "W" with Inconel "X" bare filler wire added.

Metal Arc Welding—Metal arc welds were made manually on unaged 0.045-inch and 0.062-inch Inconel "W" using direct current and metal backing. Three coated electrodes were supplied by International Nickel Co., namely Inconel 132, Inconel 132 R-46, and Inconel "X" 139. The latter two were furnished on an experimental basis.

Both 132 electrodes were produced particularly for the welding of straight Inconel, but when used with Inconel "W" show a reasonable response to age-hardening because of dilution with the base metal. The principal difference between electrode 132 and 132 R-46 is in the coating. The R-46 electrode has a titania type coating and showed better arcing characteristics than the 132 electrode. Slag removal was somewhat easier with the new electrode, although this particular characteristic is poor when compared to austenitic stainless steel electrodes.

Experimental Inconel "X" 139 electrode has a composition corresponding to Inconel "X" and therefore responds to age-hardening without the need for base metal dilution. Short time tensile strengths shown in Fig. 13 were 25,000 to 30,000 psi greater than those of the 132 electrodes and more nearly comparable to the parent material. The Inconel "X" 139 electrode is recommended when these higher strengths are of importance.

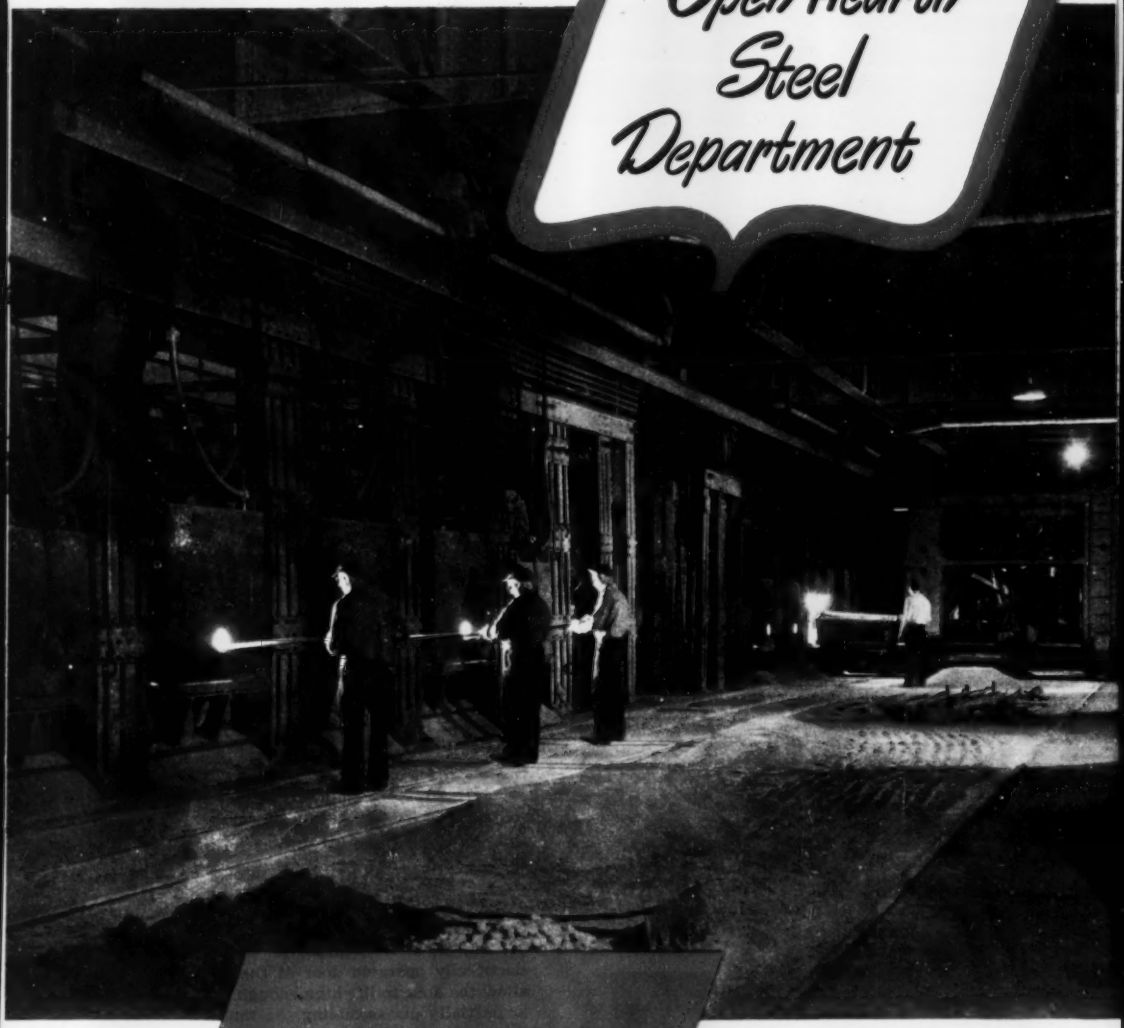
Slag removal is a definite problem and hand benching will probably be necessary. In addition, the high electrical resistivity of the Inconel "X" 139 electrode causes the wire to overheat when welding at normal currents so that short lengths of electrodes and minimum currents should be employed.

Welds made with all three electrodes bent a full 180 degrees without defects.

Stress rupture values following a direct age-hardening treatment were the same for all three electrodes, and approximately half the value of the parent metal after 100 hours at 1200° F. The conclusions concerning annealing prior to age-hardening for inert arc welds should be applied here.

Aircraft Cutter Facts Given

Ekstrom, Carlson & Co. announces a new cutter catalog. Embracing some 52 pages, there is a section included devoted specifically to the cutter needs of the aircraft industry. Available is a full line of standard and carbide-tipped router bits; also improved taper or straight shank spiral flute router bits with either up-cut or down-cut spiral. Catalog may be obtained by writing on company letterhead to the manufacturer, 1400 Railroad Ave., Rockford, Ill.



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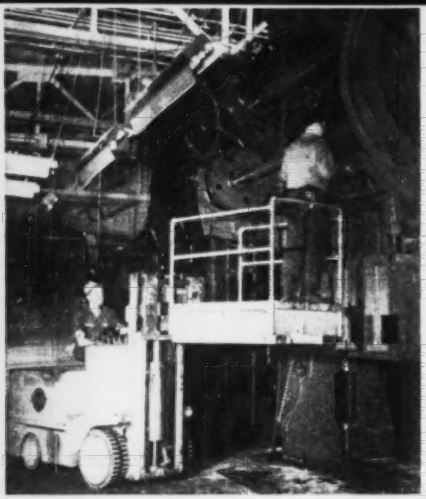
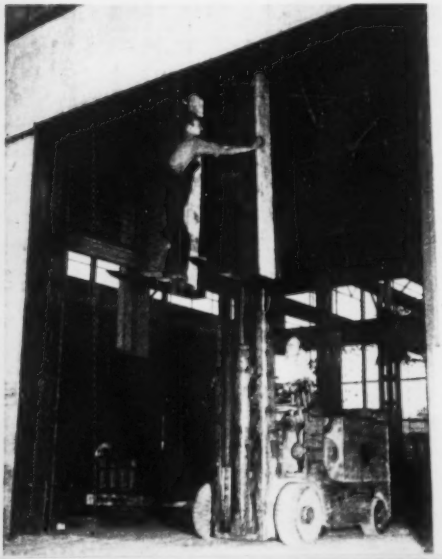


Adjustments from a convenient work level being made on one of the company's new presses

A king-size handling job is reduced to routine by co-ordinated movement of two 6000-pound fork trucks

Extra clearance at the plant entrance is provided by using timbers to push the door above its electric stop



Bonus Jobs Make Fork Trucks —A GOOD BUY

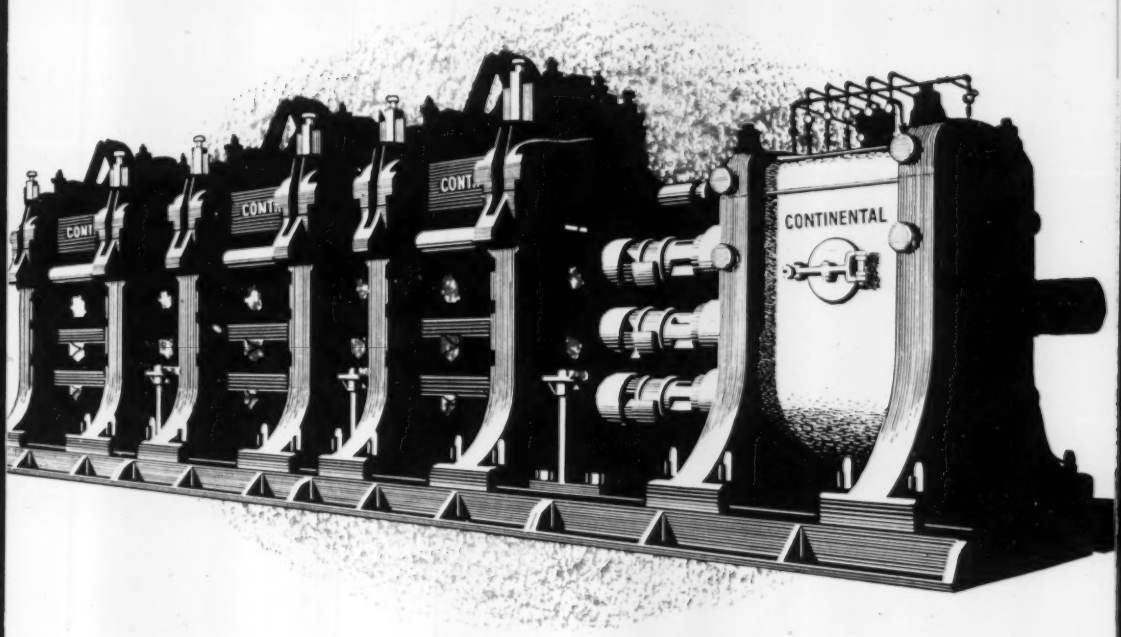
GETTING something extra out of a piece of industrial equipment and doing it efficiently makes management's decision to buy doubly advantageous. Like some other metalworking companies Star Tool & Die Works, Detroit, is getting this bonus performance out of its industrial trucks purchased from Baker Industrial Truck Division, Baker-Raulang Co., Cleveland. A little imagination is all that is needed to adapt these vehicles to jobs other than the normal handling of production materials.

These extras may involve the extension of fork truck use to repetitive operations or may be one-shot propositions. The examples illustrated include both types of operations.

Maintenance operations are often such that a fork truck carrying a special platform can save time in putting elevated jobs within easy reach. Down time on presses for die changing or making adjustments and repairs is an expensive proposition so Star uses a platform that is transported on the forks of a 6000-pound truck to effect time savings. The maintenance man gathers all tools at the work stand enabling the truck to continue on its regular job until he is ready to go. Since some of the wrenches used on large presses are heavy and clumsy to handle on a ladder and the platform can be accurately positioned for the best working height, it makes the job a lot easier than it used to be.

Late this summer the company bought a 20,000 gallon oil storage tank for installation under the plant floor. Getting the tank into the building proved impossible at first because the limit switches on the electrically operated door at the entrance would not allow the door to lift high enough. Removing the door or partially disassembling the tank would have been time consuming and expensive. The solution used was simple: A maintenance man with two stout timbers was stationed on the forks, the door was lifted beyond the travel limits and braced from the sides. After the tank was moved inside the side bracings were removed and the door lowered to its controlled travel position.

Moving two 30-foot sections of smoke stack 4 feet in diameter that were delivered to the plant yard involved another big handling problem. Its solution too proved relatively simple. Two 6000-pound fork trucks moved in on the stacks from each end, inserted their forks in the stack and from there on it was a routine handling job. Once the lift was made the only requirement was that movement of the trucks supporting the stack had to be carefully co-ordinated but this presented no real difficulty to the experienced truck operators.



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Full details are contained in Bulletin G-102

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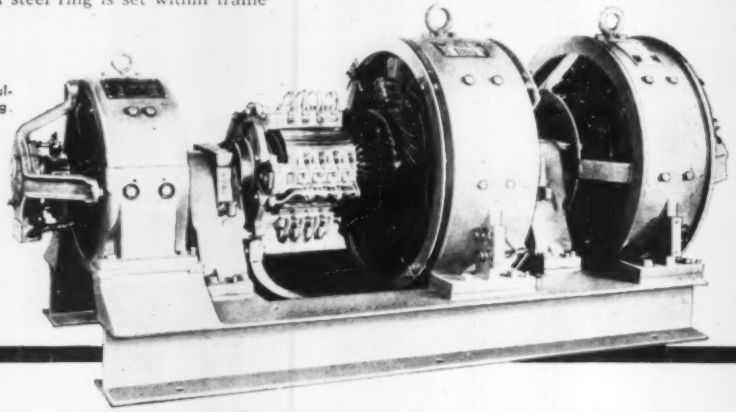

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INDUSTRY'S WORKSHOP FOR THE FINEST IN PLATING AND POLISHING PROCESSES • EQUIPMENT • SUPPLIES

Trend in Boltmaking Is Toward Smaller Fasteners

Transition to higher carbon steel affords higher tensiles and, with proper heat treatment, a smaller diameter bolt. Recently developed spring-blow punch for bolt machines permits more material to be upset in the first blow. Wiremakers have record attendance at annual meeting

USE of higher carbon steels for smaller diameter bolts and new mill practice involving restoration of carbon on the outer surface of rods call for additional heat treating equipment in the near future. This warning was sounded by W. E. Hill Jr., plant superintendent, Russell, Burdsall & Ward Bolt & Nut Co., Rock Falls, Ill., at the annual meeting of the Wire Association, La Salle hotel, Chicago, Oct. 22-25.

The widespread interest in the timely technical papers brought together one of the largest groups of ferrous and nonferrous operating and fabricating personnel ever to assemble at the annual meetings of this association.

The Mordica Memorial Lecture was delivered by Sidney Rolle, assistant manager, Scomet Co., New York, who spoke on "The Fabricating of Copper Wire." This year's Medal Award went to Curtis Voightlander, superintendent of wire mills, Union Wire Rope Corp., Kansas City, Mo., for his paper on "Borax as a Coating for Drawing High-Carbon Steel Wire." Certificates of honorable mention were presented to W. L. Wells, assistant superintendent, wire mill, Scovill Mfg. Co., Waterbury, Conn. and Walston Chubb Jr., Missouri School of Mines and Metallurgy, University of Missouri, Rollo, Mo. This year's annual meeting closed with a plant inspection trip to the wire mills of the American Steel & Wire Co., Joliet, Ill.

Mr. Hill in his paper on "Problems and Progress in Manufacturing Bolts, Nuts and Rivets," cited the transition from iron to steel and the transition that is continuing. You can visualize the requirements for holding power originating first with iron, next with approximately the present C-1008 specifications, until today when C-1018 or C-1020 steel fulfills most bolt requirements. However, the trend now is toward C-1038 and possibly this will be the "volume" steel for bolts within a short period of years. You may question why this occurs. The answer is simple upon realization. Higher tensiles are obtained from the higher carbon steels. However, for streamlining, lighter-weight finished products and particularly, conservation of materials, the same tensiles or physicals may be obtained from C-1038 as from C-1020 only by using a smaller diameter bolt properly heat treated. Therefore, the trend that is toward C-1038 is not for more holding power but for a smaller bolt.

This means to the wire and steel industry that more annealing, normalizing or spheroidizing equipment is needed. Closer inspection is needed against segregation and short-cut cropping methods during steel mill practice. To us of the bolt industry, it means more bolt heat treating equipment. In place of low temperature heat treatment only—C-1038 bolts must be hardened under atmosphere and then drawn back. In addition, another relatively new requirement is to restore carbon to the decarburized section which is on the outer surfaces of the rod. This effect on a bolt plant is different than the effect on a wire mill. The "decarb" skin aids during cold forming or upsetting. Therefore, it is best not to restore the carbon during annealing prior to the wire drawing operation. Consequently, our solution is to carburize the finished product—usually during the hardening treatment. Possibly, "carburize" is the wrong term, as we mean only to restore the lost carbon—not to add additional carbon.

A side note on holding power or tensile strength should be brought forth now as the scarcity of strategic metal becomes more and more noticeable. Nickel-chromium alloys were used for many fasteners due to their high tensile strength. During the last war, "moly" was added which enabled the nickel and chromium contents to be lowered with the tensile strength remaining about the same (I have reference here to the 8600 series of steels). Now the current trend is toward a boron addition to lower again the nickel-chromium content and also to lower the moly content. Approximately the same tensiles are again obtained for this series of steels.

A more recent development is the so-called spring blow punch. In this type of punch the entire body of the coning punch is advanced over the end of the wire by means of a spring, the advance being stopped when the punch strikes the end of the header die. The upsetting is done by forcing the pin against the

Highlights of Annual Meeting of the Wire Association

Selection of a committee to pass on all papers written by members for consideration of annual medal awards for the most meritorious paper on wire manufacture or fabrication during the year.

Division of nonferrous section into two groups, one devoted to bare nonferrous wire and end products, and the other to insulated wire and cable.

Nominated for directors to take office Jan. 1, 1952, as additional members of the board of directors: Tom M. Girdler, Jr., superintendent, Union Drawn Steel Division, Republic Steel Corp., Beaver Falls, Pa. and W. L. Wells, assistant superintendent, wire mill, Scovill Mfg. Co., Waterbury, Conn.

Sponsoring the publication of a new book under the title of *Steel Wire in America*, by Kenneth B. Lewis.

Chairman of the 1952 program committee: J. R. Thompson, manager, metallurgical department, American Steel & Wire Co., Cleveland.

Regional meetings: Los Angeles, June 12-13; Pittsburgh, May 8-9, 1952.

Future meetings: Cleveland, Carter hotel, Nov. 3-6, 1952; Chicago, La Salle hotel, Nov. 9-12, 1953.

Wire Association membership: 820

end of the wire as the stroke of the machine advances. In this manner the punch can be brought forward so as to reduce the length of unsupported stock before upsetting begins. Considerable more material can be upset in the first blow by this method.

A resume of other papers presented at the ferrous sectional meetings follows:

Progress Report on the Development of the Wheelabrator Mechanical Cleaning Process, by G. D. Dill, sales engineer in charge of steel division, American Wheelabrator & Equipment Corp., Mishawaka, Ind.—For effective cleaning of wire rod or bar stock the 15 inches diameter by $^3/_4$ inch wide or the 19½ inches diameter by 1½ inches wide wheel is used since they have a much narrower blast pattern and discharge about 200 pounds of abrasive under normal conditions. This is all that is required for material of low surface area but for large surface areas such as is encountered in the cleaning of sheets and strip steel the 19½ inches diameter by 5 inches wide wheel is used. This unit blasts about 800 pounds of abrasive per minute over a pattern about 6 inches wide by 30 inches long when the rim of the wheel is about 15 inches from the surface of the material.

A new metallic abrasive has eliminated the embediment factor and has lowered cost materially through reduction of the high consumption rate and destructive action formerly experienced. It is known as Tru-Steel shot and is a high-carbon, cast-steel shot abrasive. It is remarkably round and solid in all sizes and is fully heat treated. The final product is tough, about 45 Rockwell C, and accurately graded. It wears down rather than breaks down.

The original abrasive used was chilled iron grit which was consumed at the rate of 200 pounds per hour, with a corresponding wheel blade life of about 160 hours. In early 1949 the abrasive was changed to Tru-Steel shot and a subsequent reduction in abrasive consumption to 30 pounds per hour, or 85 per cent, and an increase in blade life to about 640 hours, or 400 per cent, was obtained. In dollars and cents the costs were reduced from $10.55 per hour to $3.59 per hour of wheel operation for abrasive and alloy blades only.

It was found that a Tru-Steel shot blasted surface of a wire rod would readily draw to a bright finish while providing at the same time a surface which materially aids in lubricating the dies. In fact it seems possible by using one of the newer types of cold wet lubricants to eliminate in a lot of cases the present operation of lime coating.

Tests have also shown that the airless blast process can satisfactorily clean wire rod at speeds equal to the entry speed of most draw benches now in use.

These results indicate that mechanically cleaned rod could be used for nearly all cold drawn products but the most obvious first applications should be for nails, welding wire, bolts and nuts, all of which do not require extra special finishes.

Admittedly this process is still in the development stage, but the potential advantages are such that we believe the wire industry will readily accept it if its merits can be proven on a production basis.

Maintenance and Improvement of Quality Cold Heading Wire, by L. R. Franks, wire mill metallurgist and J. C. Harrigan, metallographer, Keystone Steel & Wire Co., Peoria, Ill.—Cold heading wire to withstand, without fracturing, the severe compression and expansion to which it is subjected must be uniform in composition, ductile, malleable, free from pipes, segregation and injurious surface defects.

Coating or wire finishes have played an important part in the recent developments in cold heading techniques. They must be adherent and have sufficient lubricating properties to maintain long header die life, and perform satisfactorily in the various operations in addition to the regular upsetting. There are many satisfactory coatings, the choice of which is dependent upon an agreement between the cold heading manufacturers and the wire mills.

Patenting with Continuous Cleaning and Coating, by C. H. Williams Jr., superintendent, wire mills, Pittsburgh Steel Co., Monessen, Pa.—Continuous cleaning and coating in connection with patenting is a very advantageous way of performing this operation, in our particular set-up, for several reasons. Our patent furnaces are a considerable distance from our wire mill cleaning house and thus a long, costly haul is eliminated by this operation.

The wire mill cleaning house was designed principally for rod cleaning and when wire is cleaned in it, we are able to put about 800 or 900 pounds of wire on a stem as compared to 2500 pounds of rod, so it is easy to see what effect this wire cleaning in this batch type operation has on our overall cleaning and coating cost per ton. Also the condition of the bundles going to the wire drawing machines is much better coming from the continuous cleaning and coating line as compared to the ones coming from the wire mill cleaning house, as they are securely banded while the bundles from the wire mill cleaning house have had to be opened and spread out to insure proper cleaning and coating in the batch operation. These bundles tend to become tangled in handling as they are not securely tied. Another advantage of this continuous cleaning and coating to us is that a considerable amount of this breakdown wire is shipped to customers of ours for further processing, and the only further operation performed by the bundling department is to cut front and back samples and tighten the bands already put on by the blockers at the take-off frame. This practically eliminates a complete bundling operation that is necessary on wire cleaned and coated in the wire mill cleaning house. These advantages plus the fact that we think we get a better cleaning and a more uniform coating make this a very worthwhile unit in our operations.

The scale breaker of our own design is made up of three separate groups of sheave wheels of about 14 inches diameter, each set being mounted on a separate shaft and each shaft being adjustable vertically up and down. The wires can be run over the first set, under the second and over the third or vice versa and in this manner most of the scale is cracked off. We consider this scale breaker an important part of our line inasmuch as it is one of the main reasons why we are successful in cleaning and coating air patented wire in a continuous strand operation.

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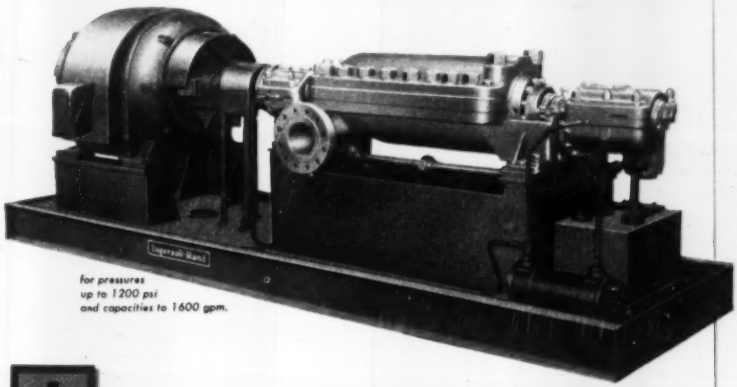

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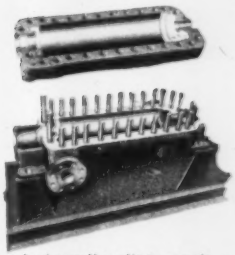

—horizontally split to permit access to rotor assembly without disturbing piping connections.

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By WILLIAM W. AUSTIN JR.
Senior Metallurgist
Southern Research Institute
Birmingham

TITANIUM AND ZIRCONIUM—
Emergency Substitutes for Manganese

Investigations on titanium and zirconium as replacements for manganese in steels indicate that these elements not only show good promise as substitutes but also impart some distinctly beneficial properties to fully-killed steels

SUPPLY of suitable raw materials is one of the most acute problems facing our rapidly expanding steel industry, and manganese may be singled out as the most critical in terms of domestic availability. One approach to the problem of manganese conservation has been that of finding satisfactory substitutes for manganese in steelmaking. Results on zirconium and titanium show good promise as substitute materials and impart a number of distinctly beneficial properties to the steel. To appraise the effectiveness of zirconium and titanium as manganese substitutes, it was first necessary to establish the influence of variation in manganese content alone upon hot shortness. Accordingly, a series of heats was prepared having a base composition of 0.18 to 0.23 per cent carbon, 0.18 to 0.23 silicon, 0.025 per cent phosphorus maximum and with sulphur contents maintained between 0.03 and 0.04 per cent sulphur. In this series manganese contents were varied so as to provide manganese-to-sulphur ratios ranging between 1.3 and 9.3; no alloy additions were made. The results of hot bend impact tests on this series are summarized in Fig. 1 where the manganese-to-sulphur ratios are plotted against the width of the hot short temperature range. It may be concluded that under the conditions studied, the minimum value of manganese-to-sulphur ratio to insure freedom from hot shortness is approximately 7.5:1. In terms of actual manganese content it is apparent that on this basis a 0.04 per cent sulphur steel would require a minimum 0.3 per cent manganese to prevent hot shortness as indicated by the hot bend impact test.

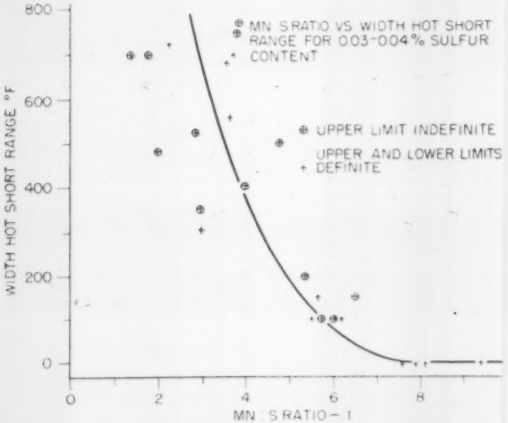

Fig. 1—Relationship between hot shortness and manganese to sulphur ratio in untreated base steel

Careful Approach Recommended — Correlation of the hot bend impact test results with actual rolling behavior must be approached with caution. In the laboratory rolling operation correlation between rolling behavior and hot bend impact results was somewhat variable. With the more severe cases of hot shortness excellent correlation was obtained. In less pronounced cases, however, it was found that some ingots could be rolled satisfactory, although appreciable evidence of hot shortness was shown by the hot bend impact test.

For example, rolling temperatures ranged between 2250°F at the roughing pass to 1750 to 1800°F at the finishing pass. This included the hot short ranges of virtually all of the heats that exhibited hot shortness. Nevertheless, a number of cases were observed where ingots that rolled satisfactorily were later found to be hot short as judged by the hot bend impact test. Hot bend impact test results, however, showed hot short ranges of 100 to 200°F in each case.

The laboratory rolling procedure involving a reduction of area of approximately 65 per cent in four passes, was considerably less severe than many conventional commercial rolling operations. Consequently, although the hot bend impact test was more critical than laboratory rolling, it cannot be concluded that it is either more or less critical as a measure of hot shortness than commercial rolling procedures. Nevertheless, it is felt that the correlation between the hot bend impact test and laboratory rolling behavior provided an adequate criterion for evaluating hot shortness in this investigation.

Zirconium as a Manganese Substitute—Zirconium additions were made to some 25 heats of the base steel. In these heats sulphur contents were between

From a paper presented at Regional meeting of the American Iron and Steel Institute, Birmingham, Sept. 26.

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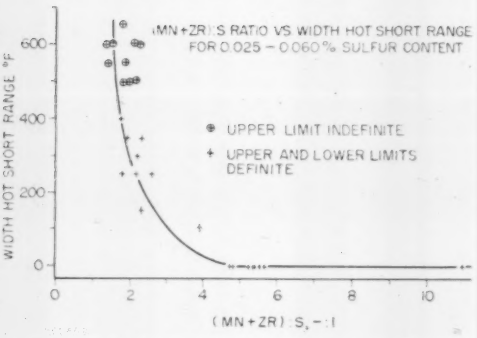

Fig. 2—Relationship, in zirconium treated heats, between hot shortness and ratio of manganese plus zirconium to sulphur

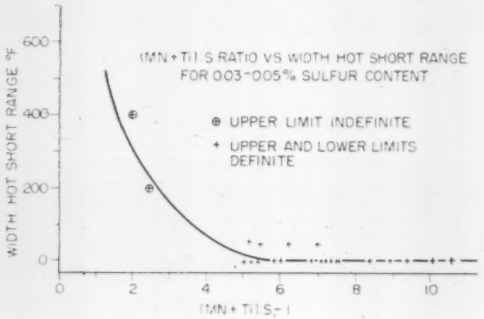

Fig. 3—Relationship, in titanium treated heats, between hot shortness and ratio of manganese plus titanium to sulphur

0.025 and 0.06 per cent with manganese ranging from 0.025 to 0.13 per cent. Each heat was melted and deoxidized with aluminum prior to the zirconium addition and ingots were poured as quickly as possible to minimize zirconium losses through oxidation.

Results of hot bend impact tests on these heats indicated a close correlation between hot shortness and the sum of manganese and zirconium contents. This relationship is shown graphically in Fig. 2 where the width of the hot short range is plotted against the ratio of manganese plus zirconium to sulphur.

According to these data zirconium is significantly more effective than manganese in overcoming hot shortness. A comparison of Fig. 2 with Fig. 1 reveals that where a minimum manganese-to-sulphur ratio of approximately 7.5:1 was required to prevent hot shortness, the corresponding (Mn + Zr): S ratio was on the order of 5.0:1. Although additional heats are needed in both series to determine absolute minimum values the increased effectiveness of zirconium over manganese seems well established.

Correlation Is Consistent—It is noteworthy that data on the zirconium heats showed comparatively consistent correlation over a wide range of sulphur and manganese contents. Manganese-to-sulphur ratios ranged from 0.86:1 to 4.8:1. Throughout the entire range the correlation between hot shortness and the ratio of manganese plus zirconium to sulphur was surprisingly close.

From these results it may be determined that a steel having 0.05 per cent sulphur content with 0.1 per cent manganese would require a minimum of 0.15 per cent retained zirconium for prevention of hot shortness, while a steel of 0.03 per cent sulphur with 0.1 per cent managanese would require only 0.05 per cent retained zirconium. A heat having 0.028 per cent S, 0.094 per cent Mn, and 0.06 per cent Zr with a (Mn + Zr):S ratio of 5.50:1 is cited as a typical example of a heat of this type which performed satisfactorily in the hot bend impact test.

In spite of the promising results obtained with zirconium additions, there are two distinct disadvantages pertaining to its use as a manganese substitute. These are its poor availability from domestic sources, and the relatively high silicon content present in commercial zirconium alloys. Although the latter difficulty may presumably be overcome through modification of manufacturing practices, the problem of domestic availability remains as a serious drawback to the use of zirconium in large quantities. As mentioned previously, several substantial deposits of zirconium ores are located within the United States, but reserves of these ores are largely unproven, and the bulk of present zirconium ore consumption is imported. Consequently the outlook for extensive use of zirconium as a substitute for manganese in steelmaking, even as an emergency measure, seems rather remote at the present time.

Titanium as a Manganese Substitute—Titanium on the other hand appears to have considerably greater possibilities than zirconium as a substitute for manganese. Its behavior with respect to hot workability in low manganese steel has been found to be altogether satisfactory.

To date some 21 laboratory heats have been prepared employing titanium additions. In these heats the sulphur contents were between 0.02 and 0.05 per cent with manganese ranging between 0.05 and 0.15 per cent. While this work is considered incomplete at this writing, several interesting and significant observations have been made. As in the case of zirconium, the ratio of manganese plus titanium to sulphur was found to have an orderly relationship with hot shortness. This relationship shown graphically in Fig. 3 may be compared directly with that of the zirconium treated heats, Fig. 2, or the straight manganese heats, Fig. 1.

From these data it is apparent that a (Mn + Ti):S ratio of approximately 5.5-6.0:1 is required to prevent hot shortness under the conditions studied. Additional work on confirmation of this value is under way, and upon its completion the limiting value will be established with considerably greater precision. It will be noted that the value of 5.5-6.0:1 compares favorably with the corresponding value for the zirconium treated series and is substantially lower than the limiting value for Mn:S ratio in the untreated base steel.

Retention of Zirconium and Titanium—In the ex-

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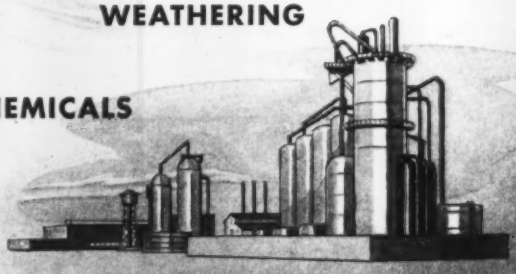

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RETENTION OF ZIRCONIUM AND TITANIUM

Per cent added	Zirconium		Titanium	
	No. of heats	Average retention, %	No. of heats	Average retention, %
0.040	2	39.9	—	—
0.050	6	38.8	4	62.5
0.075	3	41.1	2	95.3
0.100	7	23.4	4	72.9
0.115	3	36.0	—	—
0.125	—	—	2	59.2
0.150	5	34.4	5	58.3
0.200	5	23.6	1	85.0
0.300	5	16.8	1	56.7
0.400	2	39.9	1	55.0
0.500	2	33.0	1	68.0
Over-all Average		33.3		66.5

perimental work thus far, a distinct advantage favoring the use of titanium over zirconium has been noted with regard to the relative retention of these elements upon addition to molten steel. Computations have shown that retention of both zirconium and titanium is appreciably better for the smaller additions (0.05 to 0.1 per cent) than for the larger additions (0.3 to 0.5 per cent). Throughout the entire range of additions, however, retention of titanium was substantially better than that of zirconium.

The accompanying table summarizes these data showing the number of heats prepared for each of the additions noted and the corresponding retention of both zirconium and titanium. Overall average retention values for all heats employing zirconium and titanium additions are also given. It is of interest to note that the overall average retention for titanium is almost exactly twice that for zirconium.

Economic Considerations — Cost-wise, titanium is slightly more than twice (2.15 times) as expensive as zirconium considering both in the form of commercial ferroalloys. However, the substantially better retention and the far better outlook for domestic availability of titanium largely offset the advantage of lower cost for zirconium.

In the final analysis, it should be borne in mind that both zirconium and titanium are limited in their applicability to fully killed steels, and neither is likely to find extensive use as a manganese substitute in steelmaking except in a case of extreme emergency. In such a case costs would become of secondary importance and either zirconium or titanium, or both, could conceivably be used depending upon their effectiveness and relative availability at the time.

The following specific conclusions may be drawn from the results of the investigation to date.

1. The hot bend impact test is considered a reliable and reproducible means for quickly determining hot short temperature ranges in steels. Its correlation with rolling behavior, however, should be established experimentally in each case.
2. Under the conditions studied, the manganese-to-sulphur ratio required to prevent hot shortness in the base steel (0.2 per cent C, 0.2 per cent Si, 0.03-0.04 per cent S) was approximately 7.5:1.
3. In testing low manganese steel at high temperatures (2300-2400°F) it was difficult to distinguish between the effects of hot shortness due to inadequate manganese content, and overheating.
4. In low-manganese steels (0.025-0.13 per cent) with sulphur contents between 0.025 and 0.96 per cent, zirconium may be satisfactorily employed to overcome hot shortness provided the ratio of manganese plus zirconium to sulphur is maintained above about 5:1.
5. The relatively high silicon content (40-50 per cent) of commercially available zirconium alloys results in excessive silicon contents in steels where substantial zirconium additions (0.3 per cent or better) must be made.
6. In low-manganese steels (0.05-0.15 per cent) with sulphur content between 0.02 and 0.05 per cent, titanium may be satisfactorily employed to overcome hot shortness provided the ratio of manganese plus titanium to sulphur is maintained above approximately 6:1.
7. Retention of both zirconium and titanium following their additions to the base steel was appreciably better for smaller additions (0.05-0.10 per cent) than for larger additions (0.3-0.5 per cent).
8. Titanium retention was found to be far superior to zirconium retention in the experimental heats studied to date. Average over-all retention for titanium additions was 66.5 per cent, while that for zirconium additions was 33.3 per cent.
9. In the form of commercial ferroalloys, titanium is more than twice as expensive as zirconium. Nevertheless, because of its greater domestic availability and its substantially better retention upon addition to steel, titanium appears more promising as a manganese substitute than does zirconium.
10. Additional work is being directed toward the establishment of exact values for the minimum amounts of both zirconium and titanium required for the prevention of hot shortness in steel.

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Possibilities for labor saving through automatic warehousing and order picking prompted the design of this entirely radio controlled hand electric pallet lift truck by Barrett-Cravens Co., Chicago.

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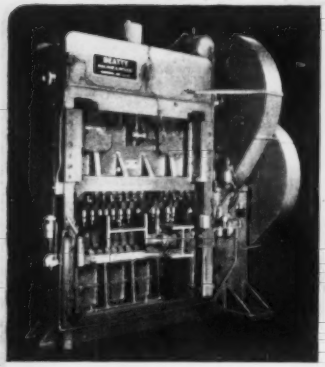
BEATTY machine parade



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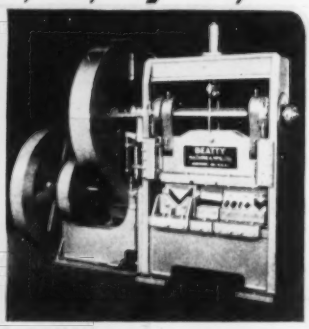

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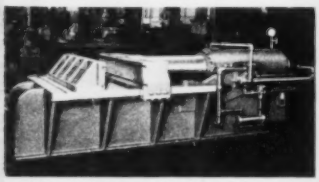

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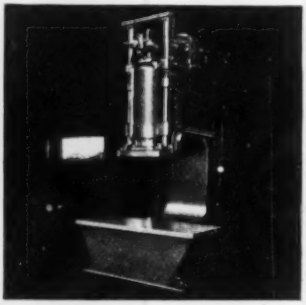
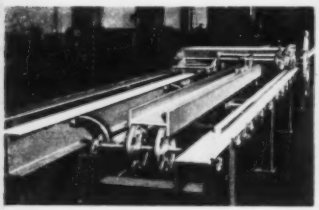


BEATTY 250-ton Gap Press for forming, bending, flanging and pressing.



BEATTY Spacing Table handles flange and web punching of beams without roll adjustment.

BEATTY Horizontal Multiple Punch for punching holes horizontally through a vertical flange of long, wide sheets.

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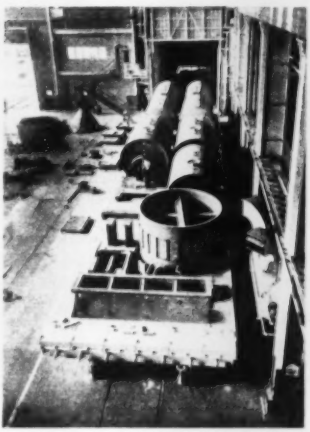
New Metals Gain in Importance

Three metals, offering outstanding resistance to extremely high temperature and corrosion, are coming into commercial production for the first time as a result of scientific research on jet and rocket motors, gas turbines and nuclear energy engines, according to two reports presented to the American Chemical Society's New York section. Titanium, zirconium, and molybdenum are fulfilling performance requirements unheard of 10 to 20 years ago and have their foot in the door of industrial acceptance and use, said Dr. Ivor E. Campbell and Dr. Robert I. Jaffee, of Battelle Memorial Institute, Columbus, O. Two others, chromium and vanadium, are "waiting outside the door," with further research and development needed before they are ready for large-scale commercialization.

Jet and rocket engines develop tremendous amounts of energy, producing temperatures so high that they demand special metals for their construction—metals that retain their strength at these extremely high temperatures, said Dr. Jaffee. In developing the unusual metals to meet these demands, metallurgists have

Stress Relief for Big Weldments



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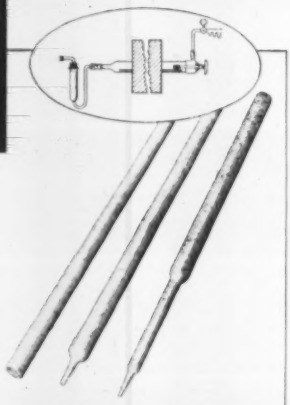

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PRODUCTS INCORPORATED

Box 4745 Redford **DETROIT 19, MICH.**

provided new structural materials which are of vital interest in chemical research and industry, especially because of their great resistance to high temperatures and to corrosion by chemicals.

Titanium is the farthest along toward becoming a tonnage industry, said Dr. Campbell, a chemist, who discussed the chemical properties and corrosion resistance of the special metals. Titanium is a structural material with light weight (intermediate between aluminum and steel), high strength (particularly in the alloyed form), and excellent corrosion resistance, he asserted. It has unsurpassed sea water and marine corrosion resistance, and withstands some types of acids. Zirconium shows remarkable resistance to certain acids which corrode titanium, and also excellent resistance to caustic. It is heavier than titanium, but lighter than steel.

Newly developed special coatings for protecting molybdenum from oxidation at high temperatures, advances in methods of welding this metal and its availability in large sizes and shapes, allow engineers for the first time to take advantage of its extremely high melting point and excellent strength at elevated temperatures.

Chromium, long known as a plating metal, now shows promise of being useful as a structural metal in its own right, according to Dr. Jaffee. The main use of chromium will be in high temperature applications in air, where its strength and oxidation resistance at elevated temperatures are outstanding, he said, adding that if methods could be devised for handling and fabricating it into structural shapes, the usefulness of chromium would be vastly increased.

The weak sister of the new metals is vanadium. Tests on high-purity vanadium made by recent improved processes have shown that, contrary to former beliefs, vanadium is a highly ductile metal. Little is known about the properties of ductile vanadium, but, so far, no really outstanding properties have been uncovered.

Conveyor Belt Splices

A new method of splicing steel cable conveyor belting, developed and patented by the B. F. Goodrich Co., Akron, places all cables under equal tension during vulcanization so that each cable carries its share of the load in the finished splice. It also permits the straightest possible splice, resulting in belts that track straight and true for economical, trouble-free

New accomplishments with Johnson's wax drawing compounds!

Aircraft Plants—Johnson's #150 Wax Lubricant successfully used in first stretch forming operation ever tried on Titanium sheet.

50% production time cut claimed on wire brush polishing of stainless steel metallic arc welds with Johnson's #111 Wax Lubricant.

Aircraft engine manufacturer reports outstanding success using Johnson's #150 Wax Lubricant forming Nimonic #75 sheet on Cincinnati Hydroform press.

Automotive Plants—Chicago firm advises drawing former troublesome annealed sheet without annealing through use of Johnson's #150 Wax Lubricant.

Michigan plant of large automotive parts supplier applying Johnson's #150 Wax Lubricant to more and more press operations due to successful experience on tough draws.

General Industry—Outstanding success reported by New Hampshire firm using Johnson's #111 Wax Lubricant for impact extrusion.

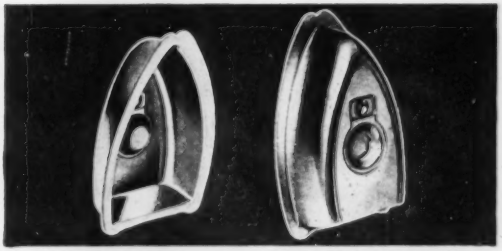
"Better finish on drawn parts . . . never seen anything that works as well tapping die castings as your wax lubricants," says Pennsylvania machine shop foreman.

For complete information on the use of Johnson's Wax Lubricants for deep drawing, tube drawing, cold heading, tapping, drilling, routing, sawing, piercing and blanking, bending, stretch forming, etc., *write*—

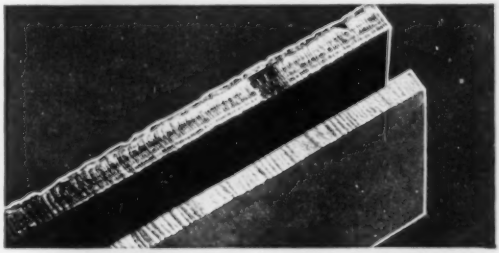
S. C. JOHNSON & SON, INC.

Industrial Products Dept. S-11

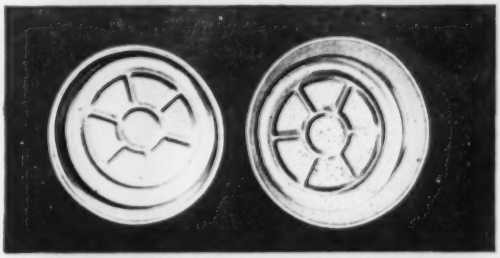
Racine, Wisconsin



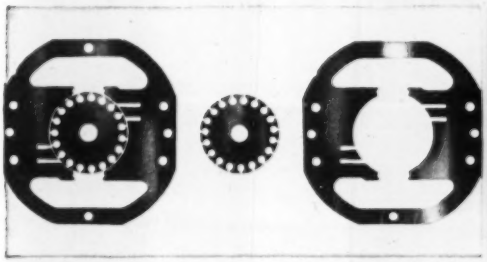
Part for steam iron drawn from #430 stainless steel with 300 ton hydraulic press. Use of Johnson's #150 Wax Lubricant eliminated shutdowns and permitted redesign of die to make draw in one operation instead of three steps formerly required.



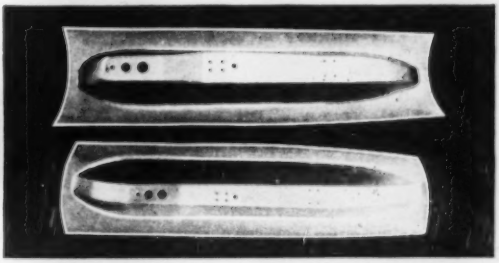
75 ST aluminum pieces cut with Onsrud high speed radial arm router. Conventional lubricant gave 3 cuts per tool—left heavy burr (top view). Johnson's #170 Wax Coolant gave 11 cuts per tool—left no burr—required 50% less pulling effort (bottom view).



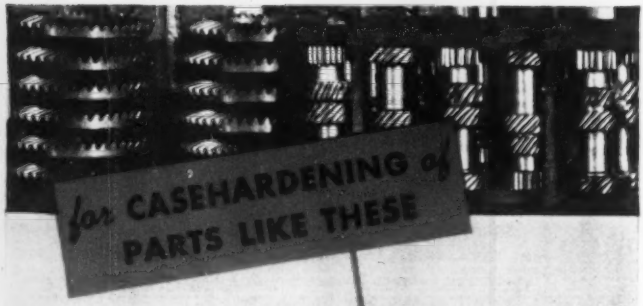
Ammunition Powder tank part of .081 gage—3 S O Aluminum drawn and swaged on automatic swaging die. Johnson's #150 Wax Lubricant applied prior to initial draw provides sufficient lubrication for swaging operation.



Motor lamination set stamped from electrical sheet. Normal run per die grind—45,000 sets maximum using conventional lubricant. Increased run per die grind to 65,000 sets using Johnson's Wax Lubricant.



Well jettison fuel tank part of .125 gage—61 S O Aluminum formed on hammer die with Johnson's #150 Wax Lubricant providing lubrication. Aircraft firm unable to produce this part satisfactorily prior to use of Johnson's #150 Wax Lubricant.



. . . and for production heat treat work of **every** kind, Holcroft furnaces have for thirty-five years been the first choice of top-flight companies in the metalworking industries.

There's good reason for such preference — and it is in engineering leadership. Many of the basic principles of modern heat treating were established by Holcroft engineers, and they constantly continue the development of new, improved methods and equipment.

The answer to your heat treating production problems may well be found in a Holcroft furnace, designed individually for your own specific job. We invite your inquiries. **Holcroft and Company, 6545 Epworth Blvd., Detroit 10, Michigan.**

Built by HOLCROFT & COMPANY DETROIT MICH.

PRODUCTION HEAT TREAT FURNACES FOR EVERY PURPOSE

CHICAGO 9 — C. H. Martin, A. A. Engelhardt, 4209 South Western Blvd.
CLEVELAND 15 — Wallace F. Schott, 1900 Euclid Ave.
HOUSTON 1 — R. E. McArdle, 5724 Navigation Blvd.
CANADA — Walker Metal Products, Ltd., Windsor, Ontario
EUROPE — S. O. F. I. M., Paris 8, France

operation. Laboratory stress-strain tests prove that the splice is as strong as anywhere else in the belt.

To make the splice, cable ends are cut in staggered pattern. Small tubular connectors are placed over the butted ends. Connectors are first given a light crimping. The partially made splice is then stressed to even the lengths of the cables, and connectors are given a final crimping to lock them to the cables. Rubber and fabric removed for the splice is then rebuilt around the cables. The splice is cured under tension with a conventional vulcanizer.

The tensioned splice can be made in the field as well as at the factory. Only special tools needed are a crimping device for squeezing the connectors to anchor the cable ends, and a special scraping tool to remove rubber from the cables.

Steam Savings Mount Up

By switching from the standard centrifugal blower to the use of axial compressors in blast furnace blowing for the larger furnaces, annual savings of over $20,000 per unit in cost of steam alone can result, W. O. Lowell, engineer-in-charge of sales of Allis-Chalmers blower and condenser section, told the operating practice session of the Association of Iron & Steel Engineers. He said that because of its design and performance record, the axial compressor unit is capable of providing an overall efficiency improvement of up to 16 per cent over a comparable centrifugal blower unit in the larger ratings.

Besides being smaller, lighter and operating at a higher speed, the axial compressor is more efficient throughout its entire range, he stated. Other advantages claimed for it include its adjustable blade that permits some modification of the rating after installation, individually mounted blades that can be replaced in the field and the fact that it can be built for much larger ratings than would be feasible with the centrifugal blower.

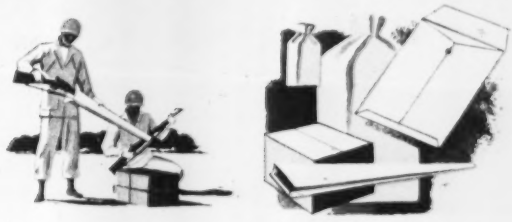
Products Meet Federal Specs

To simplify the selection of products complying with government specifications, E. F. Houghton & Co. has issued an eight-page booklet entitled, "Houghton's Government Specification Products."

This reference contains the listing of all the company's products meeting governmental specifications in the following classes: Rust preventives, lubricants, metalworking aids, cutting oils, and leather and synthetic rubber products. The listing includes the specification number and the name and description of the approved

this NEW chemically treated paper says

"Keep Out" to RUST



VOLATILIZING ACTION MAKES MOISTURE NON-CORROSIVE!

Vapor Wrapper (patented) is the new chemically impregnated paper that volatilizes under humid conditions and positively prevents the formation of rust that would normally occur. Vapor Wrapper is available in many forms—envelopes and bags for storage or the protection of metal parts in shipment . . . made to order shields and casings that protect guns, cutlery, scissors, etc. . . . or large sheets for the protection of machinery.

Give your customers the advantage of receiving parts or metal objects that are free from rust, grease, or oil coatings. Save the cost of slushing operations and enjoy the advantage of being able to store or ship parts and finished products without danger of rust.

MILITARY SPECIFICATIONS

A new military specification (MIL-P-3420) covers packaging materials treated with volatile corrosion inhibitors. For complete government specifications on rust preventives . . . for help on any rust preventive problem, write NOX-RUST . . . America's leading producer of rust preventive products.

AMERICA'S LEADING PRODUCER • RUST PREVENTIVE PRODUCTS •

NOX-RUST CHEMICAL CORPORATION

2433 S. HALSTED STREET, CHICAGO 8, ILL.

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NOX-RUST CHEMICAL CORP.—DEPT. BW3
2431 S. Halsted St.—Chicago 8, Ill.

_____ Please send me information on how to prevent rust with VAPOR WRAPPER

_____ Please have your representative call

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FIRM NAME _____

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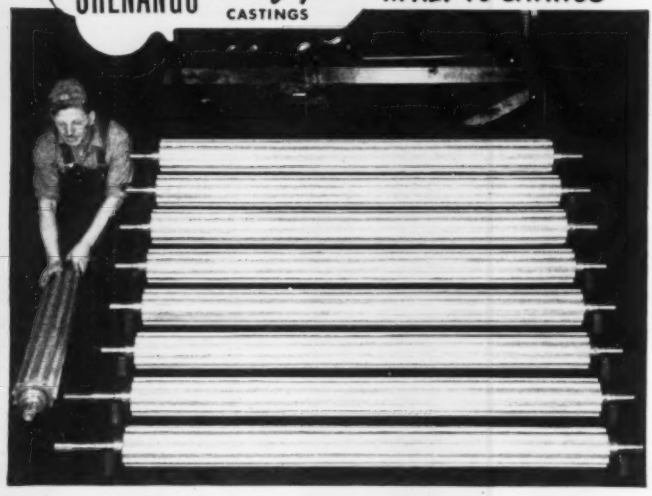
SHENANGO *Centrifugal* CASTINGS ... KEY TO SAVINGS



Typical of innumerable special shapes cast centrifugally *by Shenango, these splined "star" rolls of Meehanite Metal are used to convey coated cloth and synthetic material through a hot fast-drying process.*

Why these rolls will do a **better** job, **longer!**

WHEN symmetrical shapes, such as these "star" rolls, are cast *centrifugally* by Shenango, they gain qualities that can't be matched in ordinary castings.

For example, metal for metal there's pressure-dense grain for finer, smoother finish; higher tensile to better resist stress and impact; freedom from sand inclusions, blow holes and other hidden defects to reduce rejects and avoid costly, unexpected failure.

So, when it comes to symmetrical shapes, large or small, ferrous or non-ferrous, you'll always be time and money ahead when you specify Shenango *centrifugal* castings . . . either rough or precision finished in the modern Shenango shops.

HELPFUL BULLETINS

Bulletin No. 150 covers Shenango non-ferrous centrifugally cast parts; Bulletin No. 151 for parts of Meehanite Metal, Ni-Resist and other special iron alloys. Either or both are yours for the asking.

SHENANGO-PENN MOLD COMPANY
491 West Third Street • Dover, Ohio
Executive Offices: Pittsburgh, Pa.

SHENANGO

ALL RED BRONZES • MANGANESE BRONZES • ALUMINUM BRONZES
MONEL METAL • NI-RESIST • MEEHANITE® METAL

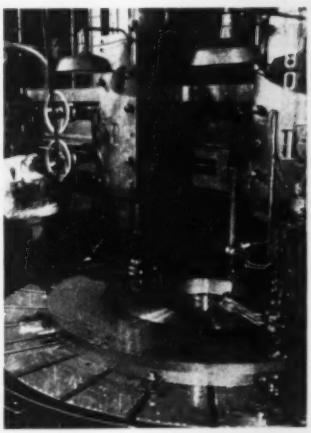
product. For a free copy of this booklet, write to E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33.

Metals Pinch Solution Proposed

Expanded use of metal powder products as a means of meeting both the critical machine tool and tooling up situation in industry, is proposed by A. J. Langhammer, president of Amplex Division, Chrysler Corp., Detroit. Finished machine parts made from Oilite can be used in thousands of defense and civilian products, he says, and often are longer lasting and of greater service than those produced from machine tools. They are shaped by a single stroke of a press, eliminating many machining operations.

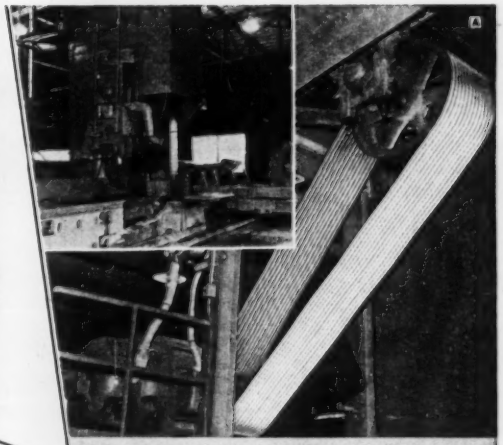
Metal powder bearings and parts are now being used in military production. Expanded use of these products could relieve the pressure of some machine tool shortages and reduce expense and time needed to make military items. These products also have practical use in thousands of civilian manufactured goods, Mr. Langhammer says. Use of Oilite parts to replace parts previously

Final Grinding Gives Slick Finish



MIRROR-SMOOTH finish is put on the rotating element of a hydro-generator thrust bearing in final grinding operation at General Electric's large motor and generator department in Schenectady, N.Y. Bearing must support a load of almost 2 million pounds including weight of all rotating parts of the generator and hydraulic turbine plus the turbine thrust. A film of oil only a few thousandths thick is all that separates the rotating element from the stationary part, making the superfine polished surface essential to successful operation

Prove for yourself why Gates Vulco Ropes are giving you longer V-Belt Wear!



This big bandmill, in the Masonite Corp. plant at Ukiah, Calif., is driven by Gates Vulco Ropes. The saw has a capacity of 200 thousand board feet of lumber in 8 hours.

There is a very simple reason why Gates Vulco Ropes—the V-belts built with *concave sides*—are giving you substantially *longer wear*—and you can easily prove this for yourself in just 2 minutes' time!

Pick up *any* V-belt whatever and bend it as it bends when going around a pulley. As the V-belt bends, grip its sides with your fingers—and here is what will happen, every time.

If the belt you are bending is a *straight-sided* V-belt, you can *feel* its sides *bulge out* as the belt bends. This out-bulge forces the sides of the belt to press *unevenly* against the V-pulley—as shown in figure 1-A (see accompanying diagrams).

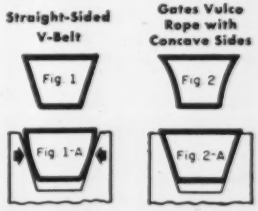
Clearly, this *uneven pressure* against the V-pulley causes the belt to wear *unevenly*—with the wear *concentrated* where the bulge is greatest—and this concentrated wear at one point naturally shortens the life of a *straight-sided* V-belt.

Now, make this same test with the belt that is built with Concave Sides—the Gates Vulco Rope!

Whereas you felt an *out-bulge* when you bent a belt with straight sides, you find that the *Concave Sides* merely fill out and become *perfectly straight*. The sides therefore *press evenly* against the V-Pulley. This distributes the wear *uniformly* across the *full width* of the belt. Naturally, this means longer belt life and *lower* belt *costs* for you!

Only V-Belts made by Gates are built with concave sides. Whenever you buy V-Belts, be sure that you get the V-Belt with the Concave Sides—The Gates Vulco Rope!

What Happens When a V-Belt Bends



How Straight-Sided V-Belt Bulges in Sheave -Groove. Sides Press Unevenly Against V-Pulley Causing Extra Wear At Point Shown by Arrows.

The Concave Sides Fill out to a Precise Fit in the Sheave Groove. No Side Bulge! Sides Press Evenly Against the V-Pulley—Uniform Wear—Longer Life!

CS-5110

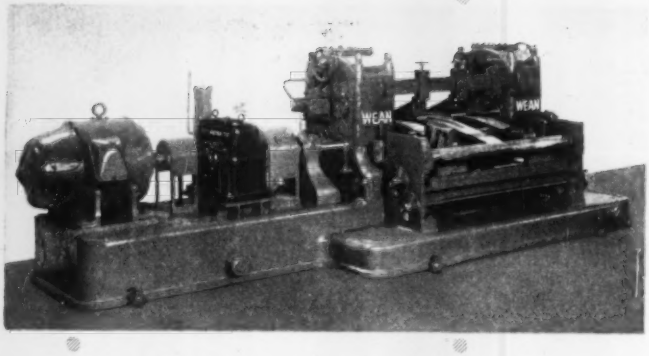
Gates® Hose V-Belts Molded Rubber Goods for Industry

VULCO ROPE DRIVES

ENGINEERING OFFICES AND JOBBER STOCKS IN ALL INDUSTRIAL CENTERS

THE GATES RUBBER COMPANY • DENVER • U•S•A

World's Largest Maker of V-Belts



H & S SPEED REDUCERS play a part

in side trimming

strip steel at

high speeds

• Cutting strip steel at high speeds is a tough job and Horsburgh & Scott Speed Reducers play an important role as part of the Wean Side Trimmers . . . available in various sizes for edge trimming hot and cold rolled strip from .006" to ⅜" thick. This is only one of the many fields in industry where H & S Speed Reducers are handling tough jobs for long uninterrupted periods with great savings in maintenance. It will pay you to talk with our engineers about your speed reduction problems.

THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

5112 HAMILTON AVE. • CLEVELAND 14, OHIO, U.S.A.

Send note on Company Letterhead for Speed Reducer Catalog 46

made of strategic metals could help maintain civilian production at the high levels necessary for maintenance of a sound economy.

Basically the production method consists of pressing metal powder particles together, forming the exact shape with a press, heat treating, and final pressing. Products may be nonferrous or ferrous. The iron powder products use a material long discarded as waste like iron oxide.

Parts produced of iron powder also provide a good alternate not only for cast iron and steel but also for highly strategic materials such as copper, tin, zinc, and aluminum. They can be used in place of many castings, stampings, forgings or bar stock. The structure of metal powder parts is such that they can be impregnated with a long term supply of oil, creating such products as heavy duty, oil cushioned, self-lubricating bearings. Oilite self-lubricating bearings and parts have been in use on Chrysler-built cars and trucks for 21 years, each vehicle containing about 66 parts.

In many cases parts made of metal powder are much longer-lived than machined parts. For example, one test showed that after long use shock absorber pistons of cast and machined aluminum, brass, and cast iron, wore more than 0.011-inch—in some cases 1/64-inch. In the same period Oilite pistons wore only 0.0002-inch.

Take Steep Grades in Stride

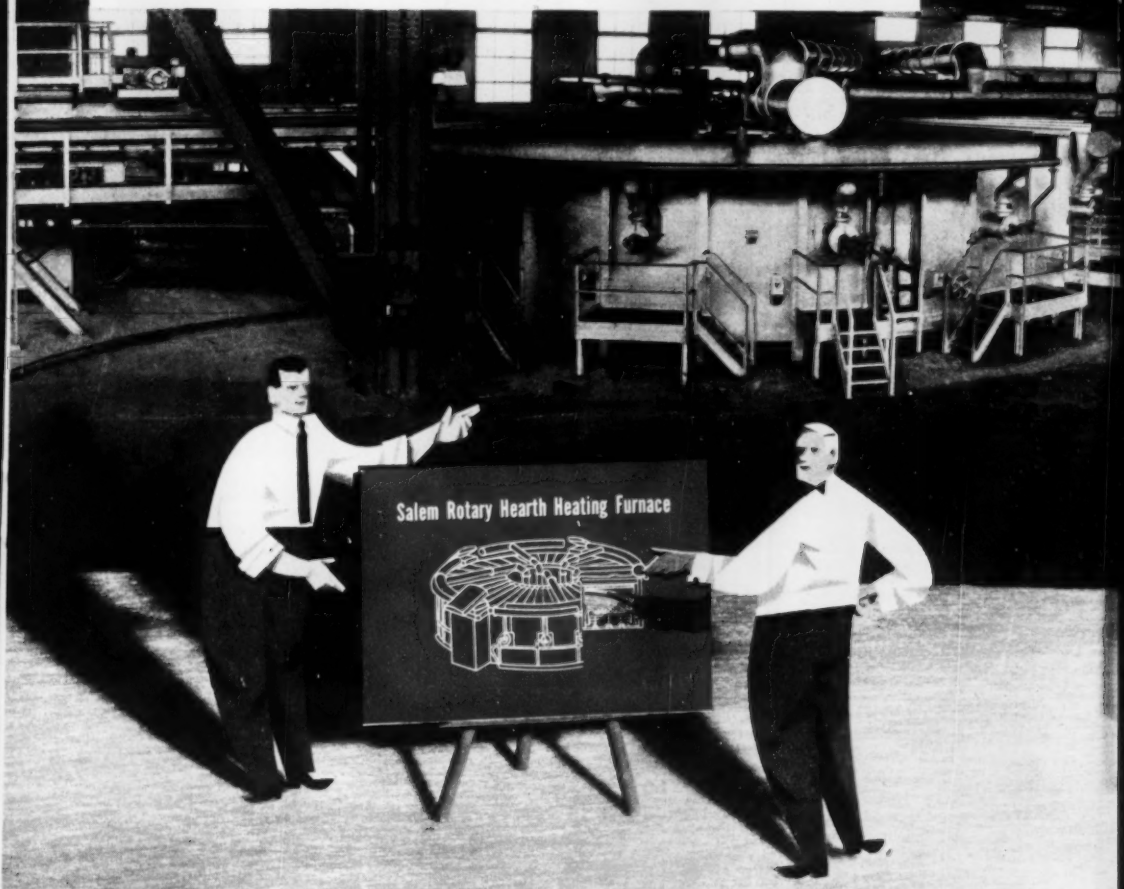
Two special rack-rail electric locomotives which climb a 10 per cent grade in Alpine winter weather are helping Austria's largest iron ore mine resume operation. Designed and built by the General Electric Co. for Osterreichisch Alpine Montangesiellschaft at Eisenerz, the 28-ton mine locomotives were purchased through ECA. The Austrian mine, developed by the Germans and knocked out by the Allies during World II, is in the process of being put back into operation. The locomotives are part of an order for 13 mine locomotives recently delivered by GE.

Unlike most American mines where a terrace arrangement allows locomotives to spiral up steep inclines, the operation at Eisenerz requires the direct climbing of 10 per cent grades. The Alpine Montan railroad, located at an elevation of 2500 to 5000 feet, includes a series of seven racks with a 10 per cent maximum grade, connected by rail sections having a maximum grade of 2.8 per cent.

Rack gear is mounted on a different level from the locomotive wheels and meshes with the rack at the foot

flexible*
accurate*

*Two good words to aptly describe the operation of a *Salem Rotary Hearth Heating Furnace* at work in your plant. Whether your hot-metal operations include piercing, forging, or rolling ferrous or non-ferrous metals, your automatically controlled Salem Rotary will flexibly and accurately adapt itself to large variations in heating and tonnage rates—thus maintaining economy despite downtime for changeover in your metal forming operations. Moreover, you'll reduce scale loss, simplify handling, and save money on labor and maintenance. For greater yield at lower cost, you should be using a Salem Rotary. Write to us.



SALEM ENGINEERING DIVISION

Salem-Brosius, Inc. Salem, Ohio

Affiliates: Brosius Division, Pittsburgh 15, Pa.
Salem Engineering Co., Ltd., Milford nr. Derby, England; Salem Engineering (Canada) Ltd., Toronto, Canada

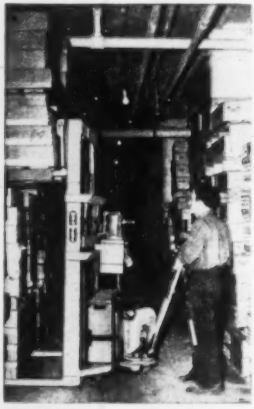
MOTO-TRUC'S MODEL PAL

- Reduces Costs
- Saves Man Hours
- Speeds Production

Model PAL Pallet

Break those Production Bottlenecks and reduce handling manpower with Moto-Truc's efficient and simple to operate "Walkies". They soon pay for themselves in savings to you.

Whether its a problem of warehousing, production "Flow" or "Inprocess" inventory; one or more of Moto-Truc's 6 Basic Models is quickly adaptable to your specific needs. Their short turning radius and added power make them the most efficient in the "Walkie" field.



A "twist of the wrist" does it.

Model PAL-SC, Pallet

The above photo shows one of Moto-Truc's Model PALS in a large eastern warehouse. They now do the work of many hands, adding 1/3 more storage space and speed up "in and out" traffic. In Pallets, Platform or Hi-lift types, Moto-Trucs cover the field for efficiency, rugged, all-welded construction and ease of operation.

Write for Bulletin No. 51 Today

DON'T BE SATISFIED WITH LESS THAN THE BEST.

THE MOTO-TRUC CO.

1953 E. 59th STREET • CLEVELAND 3, OHIO

PALLET, PLATFORM AND HI-LIFT TRUCKS

LARGEST EXCLUSIVE MANUFACTURER OF "WALKIES"

MOTO-TRUC Designers FOR THE INDUSTRY PATENTED

of each steep incline. Increased power and traction is achieved through the use of a pinion and double reduction gear, quill mounted on each driving axle and synchronized with the wheels.

Each locomotive operates as a separate unit, hauling empty cars upgrade and returning with a 60-ton load. Braking speed is 7 mph on rack and 15 mph on rail. Traction power is collected by two spring-raised, rope-lowered pantographs. Control is electro pneumatic, providing progressive series-parallel motoring operation and parallel motor dynamic braking.

New Coating Retains Brightness

Tin nickel electroplate announced recently (STEEL, Sept. 17, p. 83) remains permanently bright when exposed to the atmosphere or to many liquids and sprays that corrode other metals. It is not merely a coating that remains bright and decorative under conditions that would tarnish or rust other metals but is exceptionally resistant to many acids, alkalis and salts.

Substantiating these conclusions is a booklet "Electrodeposited Tin-Nickle Alloy Coatings" issued by Tin Research Institute, describing work done in its laboratory in the last two years. The first part relates to the method of electrodeposition and shows that operating conditions are sufficiently flexible to insure sound deposits in actual commercial practice. The second part deals with the corrosion tests and puts forth an explanation of the corrosion resistance of the alloy which could not be predicted from a knowledge only of the corrosion resistance of tin and nickel separately. Copies are available from the institute, 492 W. Sixth Ave., Columbus 1, O.

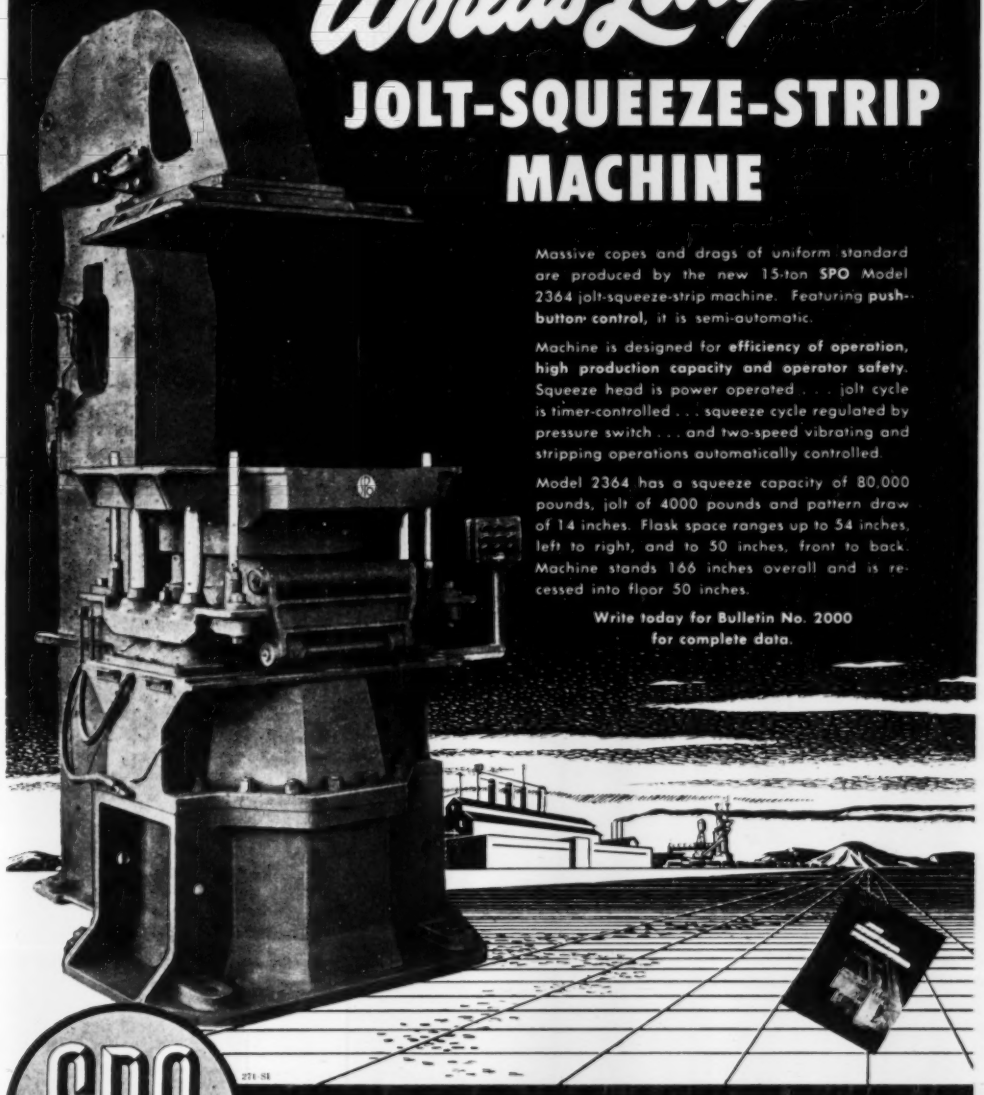
Motors Get Plastic Blowers

Another use for plastics has been found in the electric motor field, where it now is being used to replace critical aluminum and bronze for blowers in small, totally enclosed, fan-cooled ac motors. The blowers consist of a polyester resin reinforced with glass fibers. This reinforcement method is superior to organic fiber reinforcement because of increased resistance to chemical attack and increased strength per pound.

Advantages over the aluminum and bronze blowers it replaced are claimed for the new blower. It is unaffected by the chemical agents that attack the metals, making it desirable on motors used where corrosive atmospheres may be present.

The plastic blower is as much as

World's Largest
JOLT-SQUEEZE-STRIP MACHINE



Massive copes and drags of uniform standard are produced by the new 15-ton **SPO** Model 2364 jolt-squeeze-strip machine. Featuring **push-button control,** it is semi-automatic.

Machine is designed for **efficiency of operation, high production capacity and operator safety.** Squeeze head is power operated . . . jolt cycle is timer-controlled . . . squeeze cycle regulated by pressure switch . . . and two-speed vibrating and stripping operations automatically controlled.

Model 2364 has a squeeze capacity of 80,000 pounds, jolt of 4000 pounds and pattern draw of 14 inches. Flask space ranges up to 54 inches, left to right, and to 50 inches, front to back. Machine stands 166 inches overall and is recessed into floor 50 inches.

Write today for Bulletin No. 2000 for complete data.

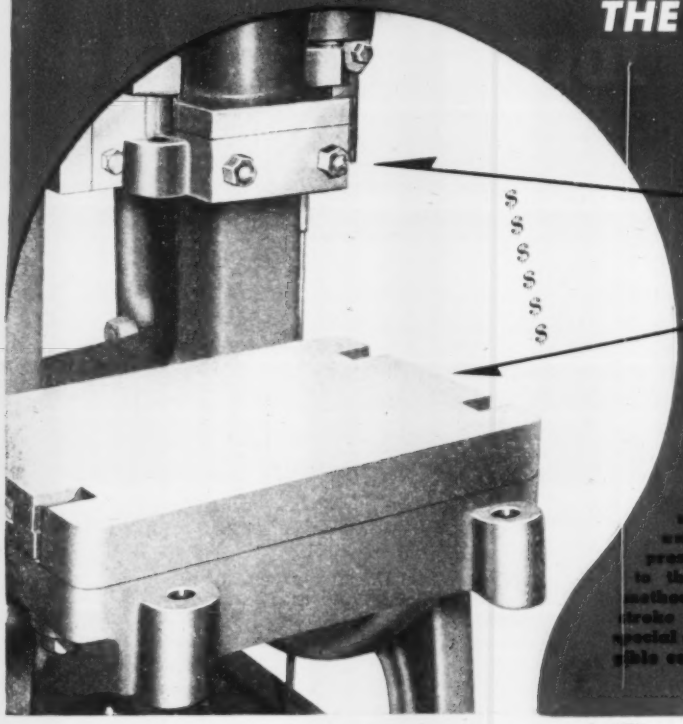
SPO

INCORPORATED

6495 Grand Division Avenue • Cleveland 25, Ohio

Johnson INCLINABLE POWER PRESSES GIVE YOU 3 TO 8 INCHES MORE IN THE "EARNING SPACE"

from HERE *to* HERE



BETWEEN the bed and the gibs, in the depth of the standard stroke, you can spot the earning capacity of a power press. Every standard Johnson model has an advantage over other presses in this respect. In addition to this, Johnson's frame-casting method permits lengthening of the stroke in one-inch increments on special custom-built presses at negligible cost.

YOUR DIE DOLLAR brings a greater return when production is scheduled on a Johnson press. Check the dimensions of competing units, and you'll see Johnson gives you more die space on smaller presses, even though the standard bolster plate is thicker. This advantage is greatest in the Models 1, 2, and 4½.

WITH JOHNSON *INCLINABLES* on the floor, a plant can handle bigger jobs with a small investment in original equipment and lower operating costs. We can send you figures to support purchasing recommendations on open back inclinable power presses of 16 to 90 ton capacity.

EXTRA SAFETY makes Johnson a better buy. Exclusive patented Non-Repeating Safety Clutch prevents accidents and protects dies. Mechanism is activated by two springs. If one breaks, the other holds clutch disengaged. If both should break, clutch automatically disengages. It takes 30 seconds to replace springs —without stopping machine.

RUGGEDLY BUILT Johnson presses have extra gib adjusting bolts on side of frame, extra front anchor bolts . . . and bigger ones . . . for longer service on heavy work without loss of precision.

Write **or call Johnson for specifications on six models of inclinable power presses now being offered. Tell us what materials you work, how you form them. Chances are a Johnson can do a better job.**

Johnson MACHINE and PRESS CORP.

620 WEST INDIANA AVENUE • ELKHART, INDIANA

one third lighter in weight than its metal counterparts. While this may be but a matter of a few ounces, the reduction of inertia where frequent, rapid reversals are required is worthwhile. Preliminary tests also indicate better resistance to abrasion.

The advantages are obtained without sacrifice in blower performance. The blower has successfully passed overspeed tests at four times normal speed. Westinghouse currently is applying these blowers to totally enclosed fan-cooled Life-Line motors in NEMA frames 254 and 284 (5 and 7½ hp, 1750 rpm).

NBS Developments Described

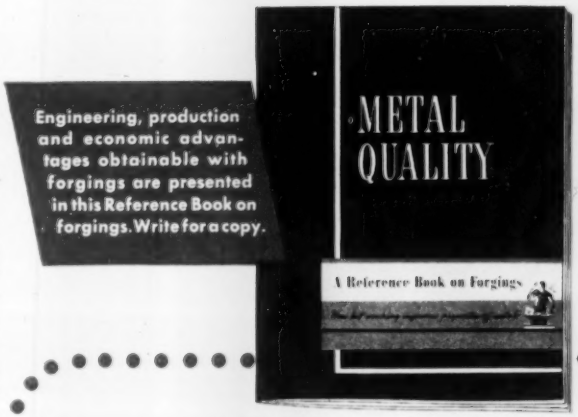
Summarizing the scientific investigations conducted by the National Bureau of Standards during the fiscal year 1950, a 113-page illustrated booklet, just published by NBS, contains accounts of current activities as well as more detailed descriptions of especially important scientific developments. Scope of research and development at the NBS, both theoretical and practical, is indicated by the names of the 13 scientific and technical divisions: Electronics, atomic and radiation physics, chemistry, mechanics, organic and fibrous materials, metallurgy, applied mathematics, mineral products, building technology, heat and power, electricity and optics, metrology, and radio propagation.

Among accomplishments during the year were the automatic computer, SEAC, the fastest general-purpose, automatically sequenced electronic computer now in operation; the electronic currency counter, designed for the Treasury Department to count old paper money at an hourly rate of 30,000 bills; and the highly precise omegatron, which discriminates between atomic particles of different masses. Designated NBS miscellaneous publication No. 200, it is available for 50 cents from Government Printing Office, Washington 25.

Solderless Terminals Save Time

Technical data catalog, of interest to electrical engineers, designers, and wire foremen, has just been published by Aircraft-Marine Products Inc. Case studies are included showing amounts of time and labor saved by use of solderless terminals on various applications.

The story of the AMP pressure crimp is augmented by test curves showing terminal performance under varying conditions of altitude, vibration, corrosion and low currents, audio and radio frequencies. Tensile curves and photomicrographs support manufacturer's claims. The 78-page


Engineering, production and economic advantages obtainable with forgings are presented in this Reference Book on forgings. Write for a copy.
METAL QUALITY
A Reference Book on Forgings

Never underestimate the preference of users of your product for the factor of greater safety that is inherent in forgings. This factor of greater safety results from toughness and strength, in correct proportion, as found only in closed die forgings. Consult a forging engineer about the mechanical properties required for your product.

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Please send 60-page booklet entitled "Metal Quality — How Hot Working Improves Properties of Metal", 1949 Edition.

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STANDARD PICKLING PRACTICE THE WORLD AROUND

CHEMICALS ACP PROCESSES

Here are some ways to pickle more steel with less acid:

1. IMPROVE THE EFFICIENCY OF YOUR PRACTICE

Use every available pound of acid before dumping, by:

a. Operating baths until more than the usual amount of iron accumulates,

b. Stopping the additions of acid sooner than usual,

c. Offsetting the slower pickling by raising bath temperature to boiling,

d. Lengthening pickling time for last one or two batches.

Do not, if possible, dump bath with as much acid content as previously. Dump only when bath fails to work after above recommendations have been followed.

2. IMPROVE THE CHEMICAL EFFICIENCY OF YOUR PICKLING

Utilize every available pound of acid before dumping, by:

a. Increasing the proportion of "RODINE"® in the bath up to 1% by volume of the acid.

The increased amount of "RODINE" will:

a. Save the acid now needlessly wasted dissolving good metal,

b. Retard from build-up, thus saving acid by reducing number of times tanks must be dumped.

Write for further information on saving pickling acids.

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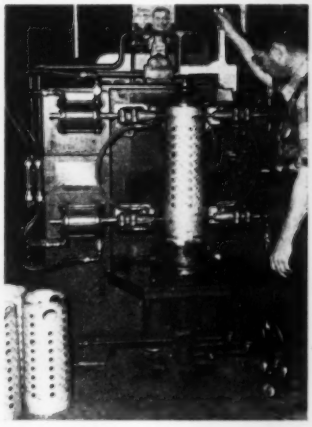
book also describes plant and research facilities and field engineering program.

Requests for copies should be addressed to: Aircraft-Marine Products Inc., 2100 Paxton St., Harrisburg, Pa.

Aligns and Spot Welds

Described as a post spot-tacking machine, this unusual tool serves as both an assembly and fabrication machine in the manufacture of inner combustion chambers for the J47 jet engine at Ryan Aeronautical Co., San Diego, Calif. It quickly aligns the three major parts of the combustion chamber and spot-tacks them together prior to a seam welding operation that finishes the job.

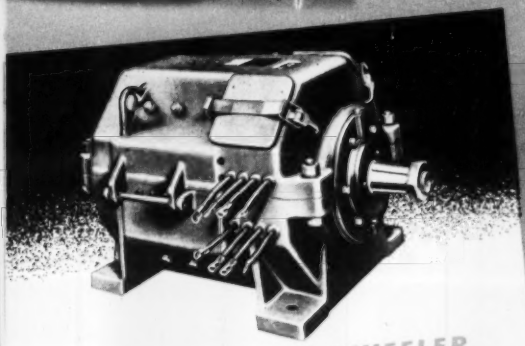
A striking feature of the machine, built by Thomson Electric Welder



Co., Lynn, Mass., is a brass and copper tool, or arbor, which serves double duty as an alignment tool and a central electrode.

At both the top and bottom of the arbor there are expanding sections consisting of four pie-shaped segments. The movement of a tapered pin, actuated by an air cylinder, expands these segments into the assembly. Four horizontal electrodes move simultaneously against the expanded sections to discharge their welding current.

In operation, the combustion chamber shell, exit shell and cap are placed on the arbor. With a touch of a foot switch, the expanding sections move outward, bringing the assembly into exact alignment and concentricity. Another foot control causes the electrodes to move in and fire, making four spot-tacks at each impulse. The assembly is rotated automatically so that a total of 32 spot-tacks can be accomplished in eight swift rotations.



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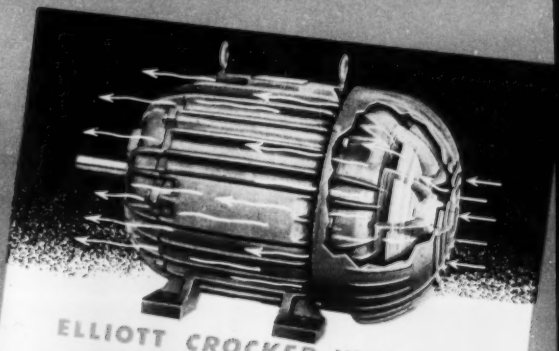
■ As sturdy and reliable as it looks, and packing as much as 33-1/3% more power in each standard size frame. For heavy duty mill and crane service in 5 to 265 hp. Also available in the following modified forms: separately forced ventilated—protected self-ventilated —back geared. Write for the Mill Motor Bulletin.



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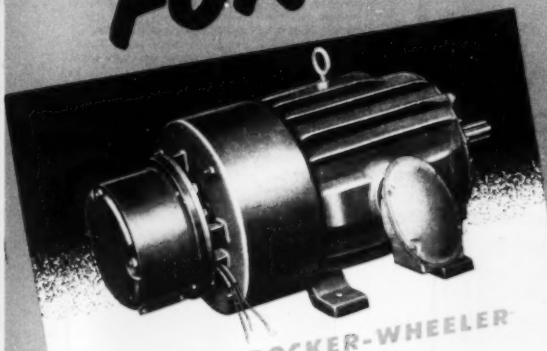
SEALEDPOWER MOTOR

■ A T.E.F.C. induction motor that both cools and cleans itself by a constant stream of fan-driven air directed along the outside of the finned case. Reliability amply proved by ten years of successful applications under most trying conditions. In 3 to 125 hp. Also available in vertical type, and in explosion-proof underwriter's approved, 20 to 125 hp. Ask for the Sealedpower Bulletin.

TOUGH MOTORS FOR TOUGH JOBS!



ELLIOTT CROCKER-WHEELER

BRAKE MOTOR

■ The C-W disc brake is exceptionally compact, requiring a minimum of bulk with relation to its stopping power. Brake linings are of bonded metal, unaffected by temperature, dampness, salt water, fungi, grease or oil. Powerful springs, compressed by magnets, are released the instant power is shut off the motor, and force the heavy armature plate against the discs. Spring pressure can be adjusted by screws from the outside of the case. The brake is shown above mounted on the SEALEDPOWER motor, providing a compact, eminently reliable and enduring unit. Write for the Brake Motor Bulletin.

...Three ELLIOTT CROCKER-WHEELER Motors

designed for high performance under particularly rugged conditions!

Crocker-Wheeler motors range from 1 to 200 hp. Larger Elliott motors and generators are built by the Ridgway Division of Elliott Company in Ridgway, Pa.

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Crocker-Wheeler Division

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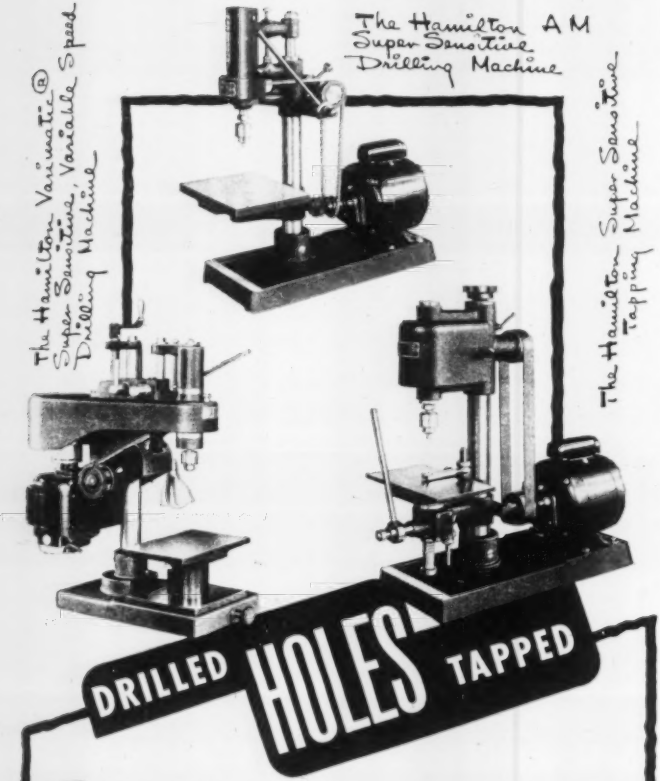
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CALENDAR
OF MEETINGS

November 5-8, American Petroleum Institute: Annual meeting, Stevens Hotel and Palmer House, Chicago. Institute address: 50 W. 50th St., New York. Information chairman: John L. Dupree.

Nov. 7-9, Annual Mechanite Research Meeting: Hotel New Yorker, New York. Sponsor's address: Mechanite Metal Corp., Pershing Bldg., New Rochelle, N. Y.

November 7-9, American Society of Body Engineers: Annual technical convention and exhibit, Rockham Memorial Bldg., Detroit. Society address: 100 Farnsworth Ave., Detroit 2. Secretary: H. V. Atmp.

November 7-9, Pittsburgh Business Show: William Penn Hotel, Pittsburgh. Sponsor: Pittsburgh Business Show Committee. Secretary: J. E. Schultz, c/o Pittsburgh Plate Glass Co., 2000 Grant Bldg., Pittsburgh 19.

November 7-10, National Conference on Coastal Engineering: Hotel Rice, Houston. Secretary: C. E. Ballesen, c/o Southwest Research Institute, San Antonio, Tex.

November 8-9, National Conference on Industrial Hydraulics: Sherman Hotel, Chicago. Sponsor: Illinois Institute of Technology. Conference secretary: John G. Duba, Technology Center, Chicago 6.

November 8-10, Steel Founders Society of America: T & O conference, Carter Hotel, Cleveland. Society address: 920 Midland Bldg., Cleveland. Secretary: F. Kermit Donaldson.

November 8-11, Automotive Parts Rebuilders Association: Fall meeting, Stevens Hotel, Chicago. Association address: 1414 S. Michigan Ave., Chicago. Secretary: Jack O'Sullivan.

November 9, American Iron & Steel Institute: Regional technical meeting, Hotel Mark Hopkins, San Francisco. Institute address: 350 Fifth Ave., New York. President: Walter S. Tower.

November 11-13, National Association of Suggestion Systems: National convention, Hotel Statler, Detroit. Association address: 122 S. Michigan Ave., Chicago 3. Secretary: J. R. Olson, c/o Peoples Gas Light & Coke Co., Chicago.

November 11-14, American Supply & Machinery Manufacturers Association: Mid-Year meeting, The Homestead, Hot Springs, Va. Association address: 731-732 DuPont Circle Bldg., Washington. General manager: R. Kennedy Hanson.

November 12-15, National Automatic Merchandising Association: Convention & exhibit, Public Auditorium, Cleveland. Association address: 7 S. Dearborn St., Chicago 3. Executive director: Clinton S. Darling.

November 12-16, National Electric Manufacturers Association: Annual fall meeting, Chalfonte-Haddon Hall, Atlantic City, N. J. Association address: 155 E. 44th St., New York 17. Managing director: W. J. Donald.

November 14-15, Industrial Hygiene Foundation: Annual meeting, Mellon Institute, Pittsburgh. Foundation address: 4400 Fifth Ave., Pittsburgh 13. Managing director: John F. MacMahon.

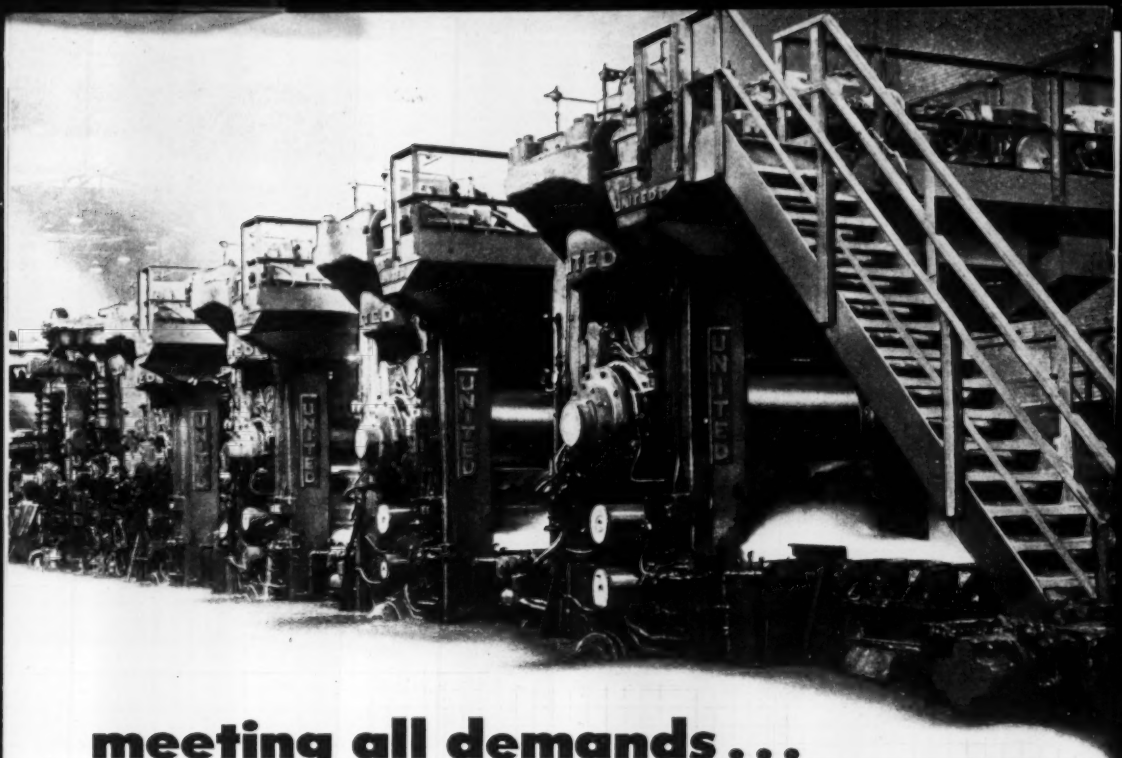
November 14-16, National Metal Trades Association: Annual convention, Palmer House, Chicago. Association address: 122 S. Michigan Ave., Chicago 3. Commissioner: Homer D. Sayre.

November 15-16, The Magnesium Association: Annual meeting, Biltmore Hotel, New York. Association address: 122 E. 42nd St., New York 17. Assistant secretary: Martha I. Hanson.

November 15-16, American Zinc Institute: Fall meeting, The Galvanizers Committee, St. Francis Hotel, Canton, O. Institute address: 60 E. 42nd St., New York 17. Secretary: E. V. Gent.

November 16, Association of American Railroads: Fall conference, Blackstone Hotel,

(Continued on p. 134)



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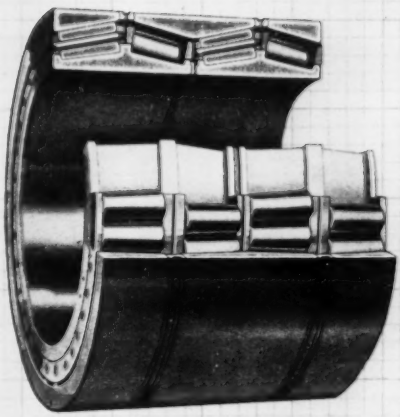
Four rows of closely-spaced tapered rollers provide tremendous radial and thrust load capacity. Reduced bearing cross-section permits larger roll neck diameters. Low coefficient of friction allows faster acceleration and operation. These advantages all contribute to the production of more and more better quality steel.

Our engineers will welcome the opportunity of working on your friction problems—for rolling mills or other heavy-duty equipment.



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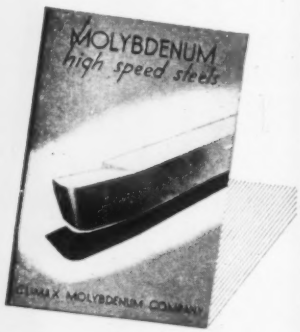

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S-11 HS II

(Continued from p. 132)

Chicago. Association address: Transportation Bldg., Washington 6. Secretary-Treasurer: G. M. Campbell.

November 26-December 1, Chemical Industries Exposition: Grand Central Palace, New York. Manager: Charles F. Roth, International Exposition Co., New York; chairman: E. R. Weidlein, Mellon Institute.

November 28-30, Scientific Apparatus Makers Association: Mid-year meeting, industrial, optical, aeronautical and military instrument sections, Hotel New Yorker, New York. Association address: 20 N. Wacker Drive, Chicago 6. Secretary: Kenneth Anderson.

November 29, American Iron and Steel Institute: Regional technical meeting, Hotel Cleveland, Cleveland. Institute address: 350 Fifth Ave., New York. President: Walter S. Tower.

November 29-30, Annual Pittsburgh Diffraction Conference: Mellon Institute, Pittsburgh. Preliminary program information: C. W. Cline, Aluminum Research Laboratories, New Kensington, Pa.

December 5, Steel Kitchen Cabinet Manufacturers Association: First annual meeting, Hotel Cleveland, Cleveland. Association address: Engineers Bldg., Cleveland 14. Secretary: Arthur J. Tuscany.

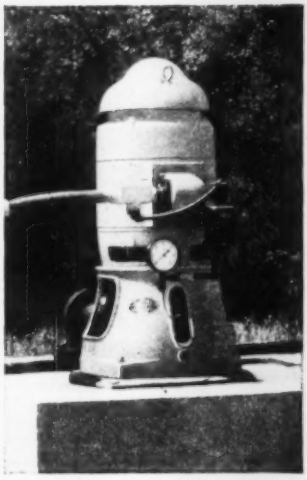
December 6-8, American Institute of Mining & Metallurgical Engineers: Electric furnace steel conference, William Penn Hotel, Pittsburgh. Institute address: 29 W. 39th St., New York 18. Secretary: Edward H. Robie.

Fuel Pump Tests Standardized

Research by Cummins Engine Co. Inc., Columbus, Ind., results in a method of standardizing diesel fuel pump testing equipment and testing procedures. Harold H. Hall, general service manager, terms the study, important to all users of company's diesels, "for if the fuel pump is not tested and set accurately, the correct performance of the engine on which the pump is installed cannot be assured."

Need for standard fuel pump testing is recognized by all users as the best way to achieve uniform results, he adds. Hydraulic characteristics may differ between fuel pump test stands and sometimes cause variable quantities of fuel to be delivered by the same pump when tested on different stands. The company is now aiming at standard servicing methods and test procedures in order to assure users comparable results.

Two fuel pump models, the single and double disk are offered by Cummins with its fuel system. Mechanical features of the fuel system introduced in the early 1930s have made possible the solution of the problems of accurate fuel metering, preparation of the charge and controlled injection in diesel engines. Single-plunger, low-pressure, distributor-type fuel pumps measure the fuel charge for all cylinders and assure that each injector receives the proper predetermined amount of fuel at any required engine speed and load within the approved ratings. When these functions are tested by a uniform method, uniform results are obtained.



FOR THE CITY OF

TOMS RIVER, New Jersey

With her population more than doubling during the summer season, the resort city of Toms River, New Jersey was facing a serious water shortage. Five old, inefficient and not too dependable wells were being operated with suction pumps. Layne was called in for a discussion of what could be done with limited funds. Layne's recommendations resulted in a contract for the rebuilding and re-equipping of one old well and the drilling and equipping of a new one. The contract also called for an auxiliary, gasoline engine drive on one of the pumps for use in case of electric power failure. Without delay everything was finished according to the contract, giving the city of Toms River a water supply that more than fulfills their present needs.

Layne handled everything complete in one inclusive contract that saved the city officials much time, useless expense and unnecessary worry. Layne offers this same type of service to any city or industrial plant in need of more well water.

NEW CATALOGS

Layne offers, without obligation, a wide range of catalogs and bulletins on well water systems, short coupled service pumps, oil and water lubricated pumps, irrigation wells and pumps, etc. You may obtain copies by addressing

LAYNE & BOWLER, INC.
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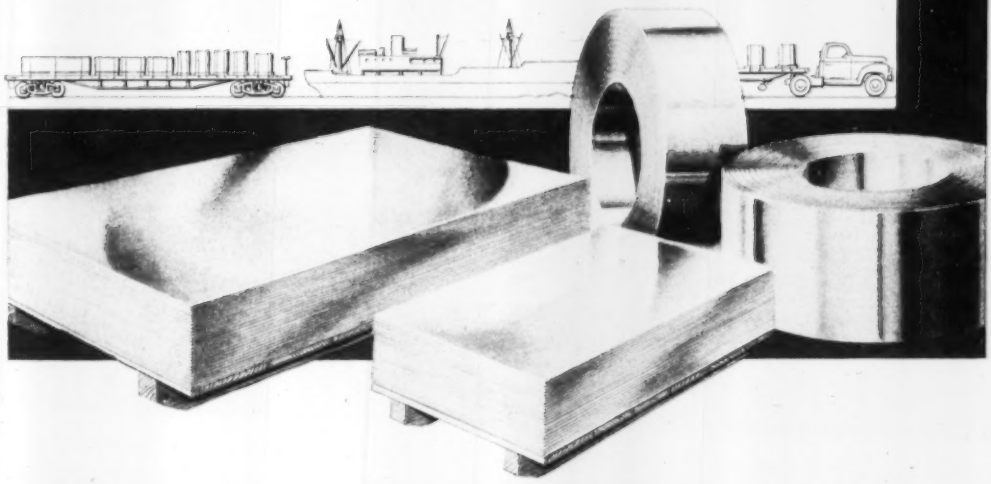
WATER SUPPLY
WELLS & PUMPS

Protect steel sheets and strip during storage and shipment with a Gulf Quality Rust Preventive



Rusting of flat rolled steel products during storage and shipment can be avoided by application of the right rust preventive. But what kind of rust preventive is best? How should it be aplied for best results? Can it be removed easily? Can it be left on during forming and drawing operations? Does it stain during annealing?

One of Gulf's rust-preventive specialists can provide effective help on these probelms. Years of experience in solving all types of corrosion problems, some of which are bound to be similar to yours, make him a logical source of information and advice. Then too, he has access to the facilities of Gulf's modern research laboratory—he can offer you expert assistance in the form of specialized study.

When he has considered every aspect of your problem he will recommend the proper Gulf Quality Rust Preventives, and advise you on the most practical methods of surface preparation and application. The completeness of the Gulf line enables him to select the product which gives the best protection against rusting under the conditions encountered, yet that can be removed economically.

He will be glad to show you some of the many examples of successful application by the steel industry in connection with flat rolled products and shapes. In every case, surface spoilage due to rusting has been eliminated. Write, wire, or phone your nearest Gulf office today.

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On this crane two 135-ton trolleys can act independently or in combination when lifting loads in excess of 135 tons. One trolley is equipped with a 20-ton auxiliary hoist to handle lighter loads.

For fifty years, Alliance has been designing, engineering and building giant cranes for heavy industry. Where unusual types of cranes are required—for any service—Alliance engineering experience and diversified background of its personnel is generally sought.

Thousands of Alliance cranes are on the job today hoisting and shifting gigantic loads . . . safely, smoothly, quickly, economically. Always rely on Alliance to give your plant dependable extra lifting power.

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New Products and Equipment

Saw Eliminates Blade Chatter

USE REPLY CARD—CIRCLE No. 1

Bett-Marr Mfg. Co., Hopkins, Minn., offers its sheet metal saw, designed for work in metal, plastic, sheet metal and woodworking shops. Chain drive gear eliminates blade chatter and allows full power at slow speeds for cleaner, faster cutting of castings and forgings. Selection of correct blade speed is made from the range of 125 fpm to 2200 fpm. Blades to ½-inch wide are used on a saw that cuts to a depth of 8¾ inches,

. . . speed selection from 125 to 2200 fpm

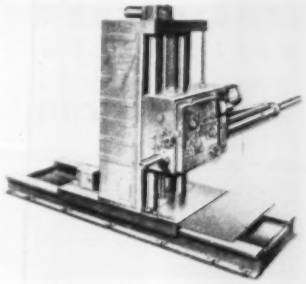
making it adaptable to finishing castings. It cuts stacks of 50 or more galvanized sheets at speeds up to 15 inches per minute. Design table is 20 x 22 inches; overall depth, 34 inches; and height, 34 inches.

Heavy Duty Drilling Machine

USE REPLY CARD—CIRCLE No. 2

Accuracy, increased power and greater range of operation are features attributed to the model 3040 heavy duty drilling and tapping machine developed by Kaukauna Machine Corp., Kaukauna, Wis. Machine drives boring fixtures and performs efficient drilling, reaming, boring, counterboring, tapping and spot-facing operations at speeds as high as are possible with modern cutting tools. Box-type column is ribbed to give rigidity and accuracy and the 4-inch diameter flame-hardened spindle with 42-inch spindle travel slides in a hardened steel sleeve mounted in precision taper roller bearings.

Spindle drive motor ranges from 10 to 20 hp. Spindle is fitted with No. 5 or 6 Morse taper and has eighteen speed changes through sliding gears actuated by a direct reading rotary dial selector lever. Pilot wheel is internally clutched, overload protected and graduated to 6 inches for depth control drilling and tapping. It has automatic feed kick-out at the preselected depth. Traverse rate is 80 inches per minute and overtravel is prevented by limit switches.

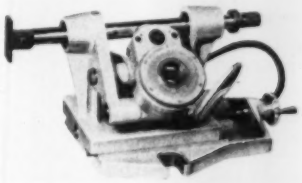


. . . hardened spindle has 42-inch travel

Measuring Cam Contours

USE REPLY CARD—CIRCLE No. 3

Cam rise gaging device that measures cam contours by optical means, simplifying and speeding accurate eccentricity measurements, is a development of F. T. Griswold Mfg. Co., Wayne, Pa. Unit measures both angle and amount of eccentricity, surface deviation at any angle of arc being recorded to ten thousandths of an inch. Reading is direct at normal eye distance without focusing.



. . . simplifies eccentricity measurements

For angular measurements, the gage is used with a dividing head and tail stock to position the cam. Gage consists of a base for positioning and securing the instrument, screw adjustment for moving optical system into contact with cam surface, contact bar and cam follower that are held against cam by adjustable weight tension, a scale and a microscope. Linear scale, engraved on contact bar, is graduated from 0 to 3 inches in 50 thousandths of an inch. As microscope enlarges these divisions, each 50 thousandth can be divided so that direct readings can be made to 0.0005-inch and movements as small as 0.00025-inch are easily and accurately estimated.

REPLY CARDS

on page 157 will bring you more information on any new products and equipment in this section.

Clamp Mechanizes Storing

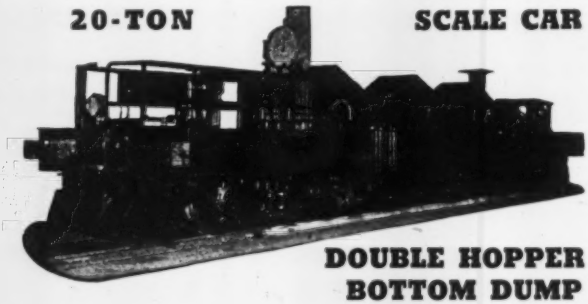
USE REPLY CARD—CIRCLE No. 4

Clamp attachment, designed to fit the company's line of Spacemaster gasoline and electric fork trucks, is announced by Lewis-Shepard Products Inc., 192 Walnut St., Watertown 72, Mass. It handles boxes, cases or unit loads up to 1700 pounds, 48 inches long on pallets, bins or skid platforms when lifting arms are used as conventional forks. When hydraulic side clamping is employed, the unit's feature is its easy handling of rolls or bales of various materials, singly or in group loads, in any position and weight up to 1400 pounds. Clamp, called Master Universal, is made of arc-welded steel. Its lifting arms are operated by two hydraulic

. . . handles unit loads to 1700 pounds

ATLAS
Scale Cars
DESIGNED AND ENGINEERED FOR YOUR SPECIFIC NEEDS

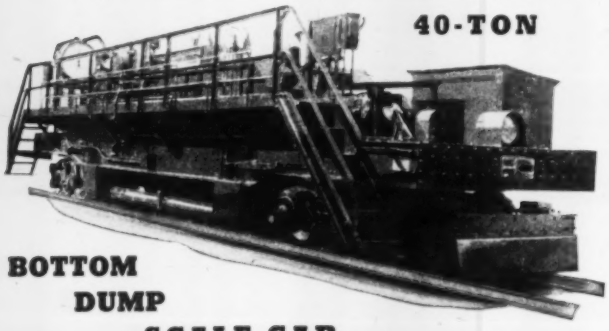
20-TON SCALE CAR



DOUBLE HOPPER BOTTOM DUMP

Car has Atlas underslung suspension scales with Atlas 24" scale Dial with chart recording. Air brakes and air-operated discharge gates. Cast steel side-frame trucks with Roller Bearings.

40-TON



BOTTOM DUMP SCALE CAR

Car has anti-friction bearings throughout, including axle mountings. Car has foot operated "Dead Man" control feature with air brakes inter-locked to apply automatically. Provided with ATLAS all-steel scales and 30" indicating dial. Type printing recorder attachment provides automatic weight registration at skip pit. All standard safety features provided including red marker lights and lights for illuminating the front of the bin.

Atlas Engineering Service is always at your service

THE ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

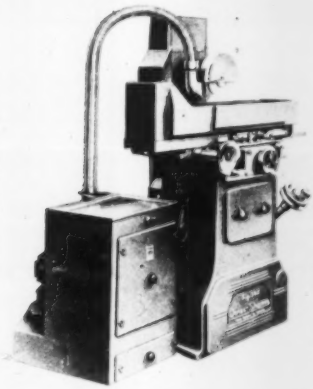
1140 IVANHOE RD. CLEVELAND 10, OHIO, U. S. A.

rams fed by the main hydraulic system of the truck and are adjustable within range spreads 18 to 46 inches and 23 to 60 inches. Hydraulic side clamping feature is operated by deadman-type control; holds lifting arms firmly in any position of closure without damaging material.

Grinder Has Central Controls

USE REPLY CARD—CIRCLE No. 5

Hydraulic surface grinder with 6 x 18-inch capacity, made by Jones & Shipman, Leicester, England, is offered in the U. S. by British Industries Corp., 164 Duane St., New York 13, N. Y. Grinder has completely centralized controls; offers vertical



. . . wheelhead adjustment is 0.0001-inch

adjustment of the wheelhead and fine adjustment for the vertical wheelfeed at 0.0001-inch.

Wheelhead spindle runs in plain journal and thrust bearings; is hardened, ground and tapered at the front end to receive grinding wheel flange plates. Bearings are diamond bored and spindles are ground and finished to within 2 microinches, root mean square. Spindle's drive is a 1 hp constant speed motor, fitted on vibration proof rubber mountings inside the column on wheelhead slide for protection from dust. Either hydraulic or hand operation of the table traverse is possible.

Metal Forming Machine

USE REPLY CARD—CIRCLE No. 6

Latest model Bendit metal forming machine, made by Kilham Engineering Inc., Plainville, Mass., has capacity to bend 15 inches of 18 gage mild steel or equivalent. It forms any desired radius from 1/32 to 5/8-inch, makes boxes up to 15 x 15 x 5 inches, handles low ductile materials, plated or painted metals without fracture or injury to surface where radius

Skelp & Plate

METAL GIRDLES for ENERGIES, LIQUIDS, GASES

In the mills that roll plate Mack-Hemp Rolls *with the striped red wabblers* set the productioneering pace because they were progressively developed for that task as rolling techniques progressed. And in skelp mills, too, the engineers and metallurgists of Mack-Hemp have always coordinated their roll research with operators' demands.

That's why so much of the skelp and plate tonnage used in vital pipe production —an estimated 9,000,000 tons in 1950— comes from mills using Striped Red Wabbler Rolls, for roughing and finishing, for work or back-up. It's understandable that so many rollers prefer Mack-Hemp Rolls for plate and skelp rolling because the records of tonnage service are always outstanding.

And, as always, Mack-Hemp is keeping ahead of the developments in rolling practice. It's that alertness to progressive changes that makes it worthwhile to keep an eye on what's new at Mack-Hemp.

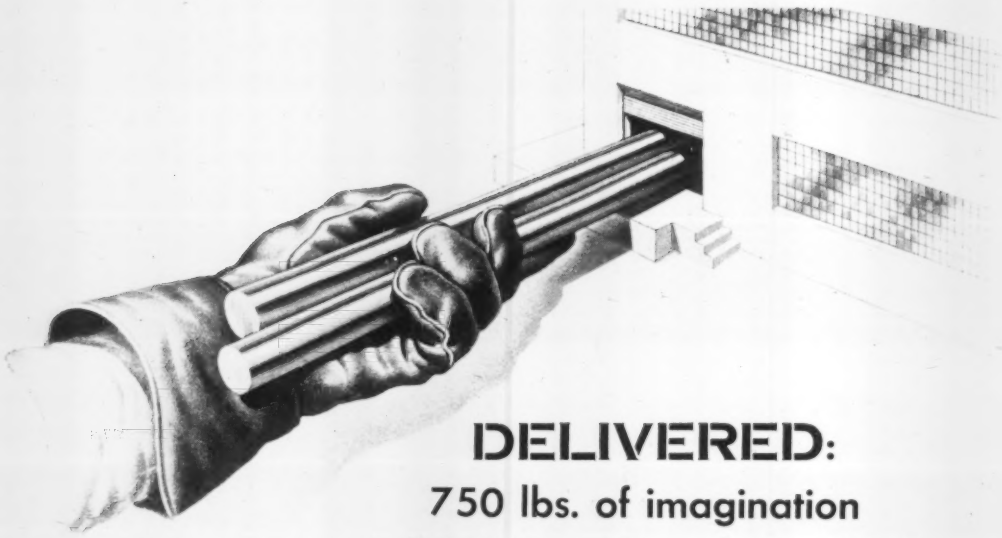
MACKINTOSH-HEMPHILL

COMPANY

Makers of the Rolls with the Striped Red Wabblers

PITTSBURGH AND MIDLAND, PA.

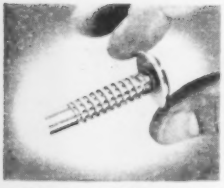
MACKINTOSH-HEMPHILL PRODUCTS INCLUDE: rolls . . . steel and special alloy castings . . . completely integrated strip mills . . . heavy duty engine lathes . . . Mackintosh-Hemphill rotary straighteners . . . improved Johnston patented corrugated cinder pots and slag-handling equipment . . . shape straighteners . . . end-thrust bearings . . . shears . . . levellers



DELIVERED:

750 lbs. of imagination

to help you outdistance competition!



News about nuts and bolts

Not too long ago many types of stainless fasteners couldn't be made commercially because no chrome-nickel stainless steel had a slow enough rate of work-hardening. Then A·E·Service was called in. Result: Carpenter Stainless No. 10, the first of its kind, made possible a new, important product.

More "muscle" for tough jobs

"We need an air-hardening die steel that is tough, hardens through in large sections, and can be heat treated with less fuss at a *lower* temperature!" A·E·Service accepted the challenge and went to work. Result: Carpenter Vega, the *only* air-hardening die steel that offers all these advantages.

From the minute those specialty steel bars from Carpenter hit your receiving dock, you have a headstart in improving your competitive position.

That's because Carpenter's **A**pplication **E**ngineering **S**ervice rides along with every bar delivered. **A·E·Service** is Carpenter's way of working with customers . . . helping them get more than "expected performance" from specialty steels. This is why the Carpenter man seldom takes your application for granted. He wants to *know* about the job. Often, former production or performance records just aren't good enough. Mill specialists may even tear the job down, then build it up again with steels virtually "tailored" to your needs.

If trends in industry indicate the need for a new steel, that's a job for **A·E·Service**, too. The fact is, Carpenter customers are often the first to profit from a pioneering program developing new and better steels to accomplish hitherto unheard-of results.

This is **A·E·Service** . . . a truly different concept of service on specialty steels. This is the thinking and imagination that accompany every bar of Carpenter Steel you apply.

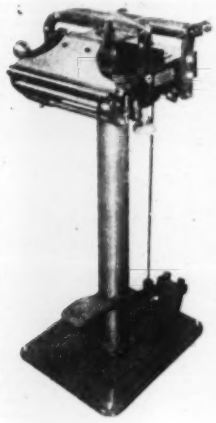
Carpenter A·E·Service *keeps you ahead of competition*

THE CARPENTER STEEL COMPANY • READING, PA.

Pioneers in improved Tool, Alloy and Stainless Steels through continuing research

of bend is large enough to avoid cracking the paint. Bends of any angle, including complete folds and partial bends can be made.

Developed primarily for short run production work, such as forming aircraft components, it eliminates the need for dies and intricate tooling. Positive stops and gages permit ac-



. . . no need for dies and intricate tooling

curate duplicating and open ends front and back allow feeding long strip stock. Interchangeable bending blades of soft steel are supplied, to be cut or sawed to size to meet job requirements. Actual bending is done by a hardened and ground steel roller.

Automatic Thread Grinder

USE REPLY CARD—CIRCLE No. 7

An automatic thread grinding machine, made by Reishauer Tool Works Ltd., Zurich, Switzerland, is introduced by Cosa Corp., 405 Lexington Ave., New York 17, N. Y. Machine grinds small and medium threads on straight or spiral fluted taps, micrometer spindles, worms, thread gages, screws and studs. It is designed for high speed production, operating on the longitudinal feed principle and using a single thread grinding wheel. Its design gives maximum accuracy for grinding small pitches. Down times are limited to changing workpieces.

Grinding wheel is trued automatically during return stroke of the work table and measuring time eliminated as machine grinds to size. Manual adjustment is confined to periodical check of the truing diamond. Grinding slide, carrying the grinding head, performs the movements for feed and relief grinding; head can be set in the helix angle. Longitudinal move-

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WRITE FOR BULLETIN NO. 79

SILENT HOIST & CRANE CO. 849 63rd ST., BROOKLYN 20, N.Y.

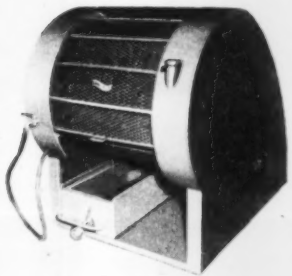
ment of the workpiece corresponding to the desired pitch is accomplished by the table slide.

Tumbler Capacity Increased

USE REPLY CARD—CIRCLE No. 8

Grav-i-Flo Corp., 400 Norwood Ave., Sturgis, Mich., has added model 36-2 tumbling machine to its line of tumbling process equipment. The tumbler's two 18 x 40-inch ID compartments offer increased capacity per area of floor space over previous equipment, permitting grinding, deburring and finishing of metal parts in larger quantities at faster time cycles.

Compartments are furnished with ½-inch plate unlined or ¼-inch plate



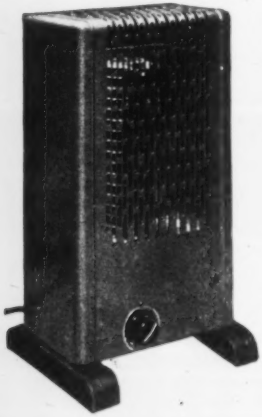
. . . larger quantities, faster time cycles

rubber-lined. Doors have cam locks with manually released safety stops to provide pressure relief. Magnetic starter has reduced voltage control to meet plant electrical standards. A limit switch on the safety guard cuts off current to stop barrel rotation when guard is lifted. Motor is 220-440 v, 5 hp, with magnetic brake.

Electronic Height Indicator

USE REPLY CARD—CIRCLE No. 9

An electronic height indicator, introduced by Sheffield Corp., Dayton 1, O., is made for use in the toolroom, for receiving process and final inspection where highly accurate measurements are desired from surface plate reference. Measurements are taken from above or below a surface without reversing the clockwise movement of the indicator hand from the minus to the plus side of zero on the scale. A sensitive adjustment knob atop the pickup unit provides maximum adjustment of 0.010-inch of gaging stylus. Mounting bracket is adjustable vertically on the column to any point within an 18-inch range by means of a rack and pinion. Extension arm can be adjusted horizontally to bring the pickup head to any point 4½ to 11 inches from



Why not use Perforated Metal?

This Wesix Electric Heater shows a typical application of Hendrick Perforated Metal, combining utility and attractiveness. The heater guard is 20 gauge steel, with 3/16" x 1½" side stagger perforations.

With facilities for producing any required shape and size of perforations in any commercially rolled metals, Hendrick invites inquiries from manufacturers who may be considering the use of perforated metal in connection with any of their products.

1876 — Seventy-Fifth Anniversary — 1951

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Our warehouse distributors are available to assist you in solving application and supply problems. Write for the name of the MicroRold distributors in your area.

Yours truly,

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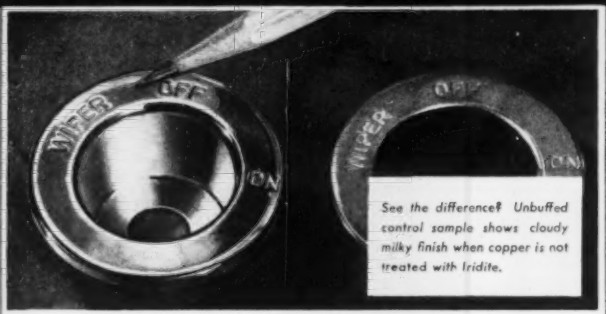
John C. Richards

John C. Richards,
General Manager of Sales

LOOK— what you get WITHOUT BUFFING



See the difference! Unbuffed control sample shows cloudy milky finish when copper is not treated with Iridite.

with IRIDITE® Metcote in
COPPER-CHROME FINISHING

This sparkling bright finish is the result of just a simple dip in Iridite Metcote between the copper and chrome plating cycles! You actually get the clear, bright appearance of copper-nickel-chrome because the Iridite treatment gives maximum brilliance and clarity to the copper undercoating.

FORGET BUFFING COSTS, PR PLATING! Once you've properly prepared the base metal . . . steel sheet or zinc casting . . . you can completely forget buffing costs because no further buffing is required! And, there is no need to resort to PR plating or extra brightener in the copper plating solution because of the chemical polishing action of Iridite Metcote. The result? A pleasing clear, sparkling bright finish that is ideal for decorative products.

PROVE IT YOURSELF! Send us samples of your product for test-processing with copper, Iridite Metcote and chrome. Then make your own inspection and tests. Once you've seen your own product treated with this Iridite finishing system you'll never go back to slower, more costly buffing for your bright finishing. Start saving money *now*—write us direct or call in your nearest Iridite representative. Look under "Plating Supplies" in your classified telephone directory.

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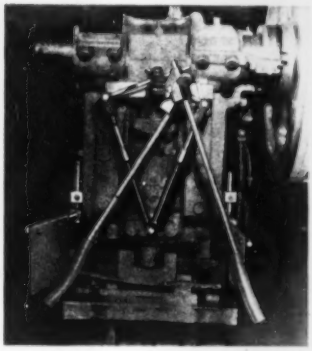
Manufacturers of Iridite Finishes
for Corrosion Resistance and Paint Systems for Non-Ferrous Metals; ZIP Plating Chemicals.

the column. It is also adjustable radially within a range of 345 degrees. Pickup head can be rotated and locked in any position at any point within a full range of 360 degrees.

Arms Guard Fingers, Hands

USE REPLY CARD—CIRCLE No. 10

Sweep-type guard adapted to short-stroke, long-die power presses is an addition to the line of guards and accessories made by Searjeant Metal Products Inc., Box 106, Mendon, N. Y. When ram is in the up position, both arms of the protective device are suspended in front of the bolster



. . . a clean sweep at half speed

plate center. In this position they do not interfere with two-handed operation. As the ram descends, arms swing right and left respectively from their central position sweeping clear the entire press working area before downward stroke has progressed far enough to close on fingers or hand. Each arm travels at only half the speed required by a single arm guard in covering the same area, eliminating tendency to snap. Unit is mounted on a hinged bar swung to one side easily when die setter is changing dies or making press adjustments.

Pedestal-Mounted Pump

USE REPLY CARD—CIRCLE No. 11

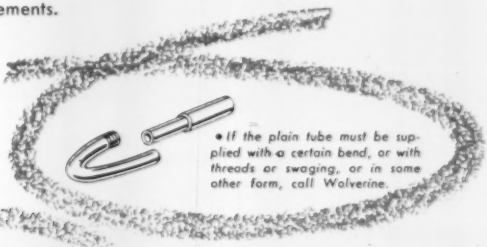
Pedestal-mounted pump with oil-lubricated bearings, for handling chemicals, liquors, corrosive materials and solutions, hot liquids, and petroleum is available from Allis-Chalmers Mfg. Co., 1021 S. 70th St., Milwaukee, Wis. Liquid end is a complete self-contained unit. It can be ordered in stainless, Monel metal, nickel or other specified material when used for pumping liquids that would attack iron or bronze. Pedestal is cast iron, with two antifriction bearings supporting the pump shaft. Pump sizes are available in

So now you must make something different, eh!

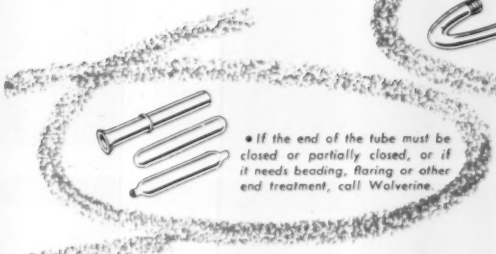
As a subcontractor you have been asked to furnish a product for the emergency. Fine. You have all the facilities to produce it, with one exception — the manufacture of one component — a tubular part — which is "a little out of your line."

So you must seek outside help. You naturally come to Wolverine Tube Division, who has had over thirty years experience in the manufacture and fabrication of tubing and has worked closely with government specifications.

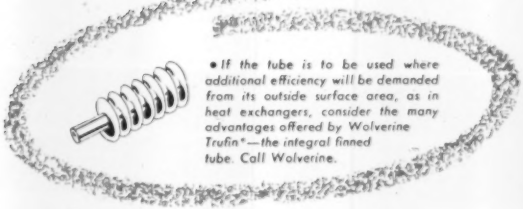
With this experience, supported by man-power and special equipment, Wolverine is ready to accept your problem with a thorough understanding of the needs of the job. You can be sure that the tubular part which Wolverine furnishes will meet all requirements.



• *If the plain tube must be supplied with a certain bend, or with threads or swaging, or in some other form, call Wolverine.*



• *If the end of the tube must be closed or partially closed, or if it needs beading, flaring or other end treatment, call Wolverine.*



• *If the tube is to be used where additional efficiency will be demanded from its outside surface area, as in heat exchangers, consider the many advantages offered by Wolverine Trufin*—the integral finned tube. Call Wolverine.*

Your answer to the question: "Who is best equipped to supply the tubular part I need for this D.O.?" can be found here at Wolverine Tube Division.

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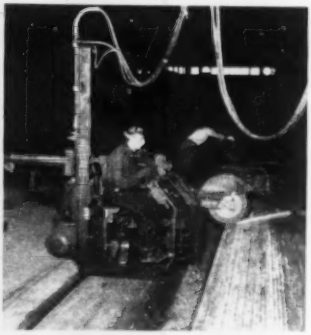
capacities to 1200 gallons per minute, at heads to 250 feet and temperatures to 500° F. Six alternate sealing mechanisms are used, depending on type of liquid being pumped and pumping conditions.

Finishing Steel Slabs

USE REPLY CARD—CIRCLE No. 12

Using the hydraulic principle of operation, an automatic grinding machine made by Mid-West Abrasive Co., Owosso, Mich., offers improvement in speed and safety for finishing steel slabs. The machine is mounted on a track; runs back and forth along the full length of the slab



. . . track mounting is plate planer-type

while the snagging wheel is raised or lowered, tipped or moved across the face of the slab at will. Its use promises also to cut down or eliminate danger of broken wheels.

Among the results of its accuracy and operating ease are reduction in metal loss and lower maintenance expense. It eliminates much of the physical hazards normally associated with swing grinding and minimizes physical effort required to prepare slabs for rolling.

Rollers Individually Driven

USE REPLY CARD—CIRCLE No. 13

An individually driven motor roller unit is offered by Loewy Rolling Mill Division, Hydropress Inc., 570 Lexington Ave., New York 22, N. Y. The unit is designed for heavy duty service in plants where conveyor tables are required. Roller's speed adjusts automatically to the weight of the load transported, eliminating danger of overloading. Rotor has low inertia necessary for constant start-stop operation. Each roller is driven directly by an individual motor without couplings, reduction or bevel gears. Roller motor and supporting bracket form a self-contained unit

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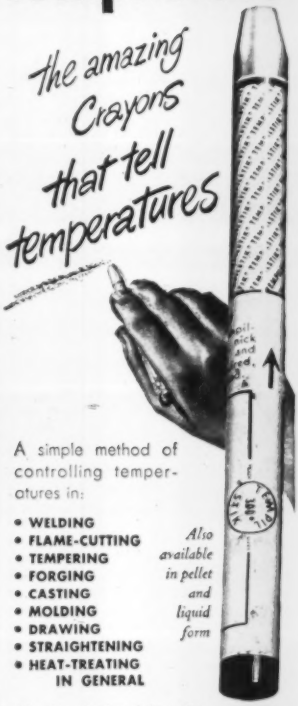

A simple method of controlling temperatures in:

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- TEMPERING
- FORGING
- CASTING
- MOLDING
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- STRAIGHTENING
- HEAT-TREATING IN GENERAL

Also available in pellet and liquid form

It's this simple: Select the Tempilstik° for the working temperature you want. Mark your workpiece with it. When the Tempilstik° mark melts, the specified temperature has been reached.

$2 each

gives up to 2000 readings

Available in these temperatures (°F)

113	263	400	950	1500
125	275	450	1000	1550
138	288	500	1050	1600
150	300	550	1100	1650
163	313	600	1150	1700
175	325	650	1200	1750
188	338	700	1250	1800
200	350	750	1300	1850
213	363	800	1350	1900
225	375	850	1400	1950
238	388	900	1450	2000
250				

FREE —Tempil° "Basic Guide to Ferrous Metallurgy" — 16¼" by 21" plastic-laminated wall chart in color. Send for sample pellets, stating temperature of interest to you.

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that can be mounted in any desired table pattern. Reversible ac motor is entirely shockproof and requires no flexible coupling between rotor and transporting roller. Steel shafts that support the heavy antifriction bearings wherever they are under strain can be made shockproof by spring support. Open slot in supporting bracket permits each unit to be lifted out without dismantling.

Full-Revolving Derrick

USE REPLY CARD—CIRCLE No. 14

Self-contained, full-revolving steel derrick, made by Clyde Iron Works Inc., Duluth 1, Minn., is available with either gasoline or electric power. Short tail swing (5 feet 6 inches), absence of stiff-legs or guy lines,

. . . a space-saver for congested areas

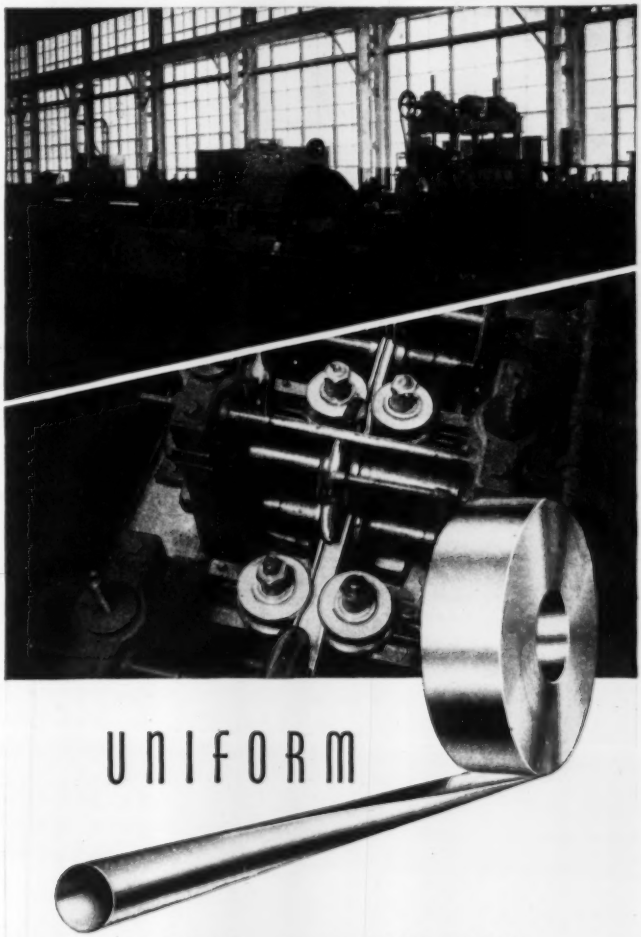
keep ground space occupied to a minimum and indicate its application to operation in congested areas.

Rotating structure that supports boom and supporting members also supports hoisting machinery, helping provide counterweight for additional stability when swinging loads. Complete rotating structure is centered on a cast steel turntable by a bronze bushed center pin supported by four double tapered, antifriction bearing rollers. Boom lengths of 20, 30 or 40 feet are available with load capacities from 2000 pounds at 40-foot radius to 10,000 at 10-foot radius.

Wider Vise Jaw Increases Use

USE REPLY CARD—CIRCLE No. 15

Columbian Vise & Mfg. Co., 9021 Bessemer Ave., Cleveland 4, O., introduces a 4-inch jaw hydraulic machinist's vise, model 1004, replacing its previous 3½-inch model. Addition of jaw space increases the number of applications suited for this type unit. Vise weighs 80 pounds, sub-



Newly built and newly equipped, Wallingford's tubing mill is as modern as today. This equipment, operated by men of experience, using Wallingford strip steel of consistently high quality, produces tubing that in analysis, tolerance and finish can be counted on to be uniform at all times. This complete dependability provides savings in fabrication. Less down time, fewer rejects, and a finished product of constant quality is assured with Wallingford uniform tubing.

THE WALLINGFORD STEEL CO.

SINCE 1922

WALLINGFORD, CONNECTICUT, U.S.A.
LOW CARBON • HIGH CARBON
ALLOY • STAINLESS • STRIP and TUBING

"MULTICUT" "TUFCUT" "HOT WORK"

Wapakoneta
SHEAR BLADES
and ROTARY KNIVES

Any type or size blade of proper Alloy with correct hardness and temper for every type shearing machine and every kind of job.

Rx ENGINEERED TO THE JOB

Every Wapakoneta blade is made to exact specifications, designed for the particular job. Complete records with order number of each blade makes possible duplication of exact size and temper at any time.

The WAPAKONETA MACHINE CO.
Shear Blade Specialists Since 1891
Wapakoneta, Ohio

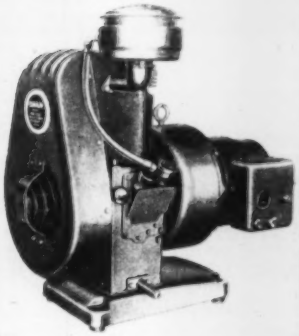
stantially heavier than previous models; has maximum hydraulic pressure of 7000 psi, and maximum jaw pressure of 4000 pounds.

A safety valve protects against overloading and jaws are closed without damaging castings or finished surfaces. Closing speed is ⅞-inch per pump stroke; full opening is accomplished in 3 seconds. Two foot pedals, one for power, the other for release, are used for control. Hydraulic operation permits operator to employ both hands to handle and position material.

Diesel Plant Generates 3000 w

USE REPLY CARD—CIRCLE No. 16

Diesel electric plant that generates 3000-w, powered by an air-cooled full-diesel engine, is offered by D. W. Onan & Sons Inc., Minneapolis 14, Minn. Designated model 3DSP-1E, its design permits simplified opera-



. . . uses 0.155-gallon furnace oil per kwhr

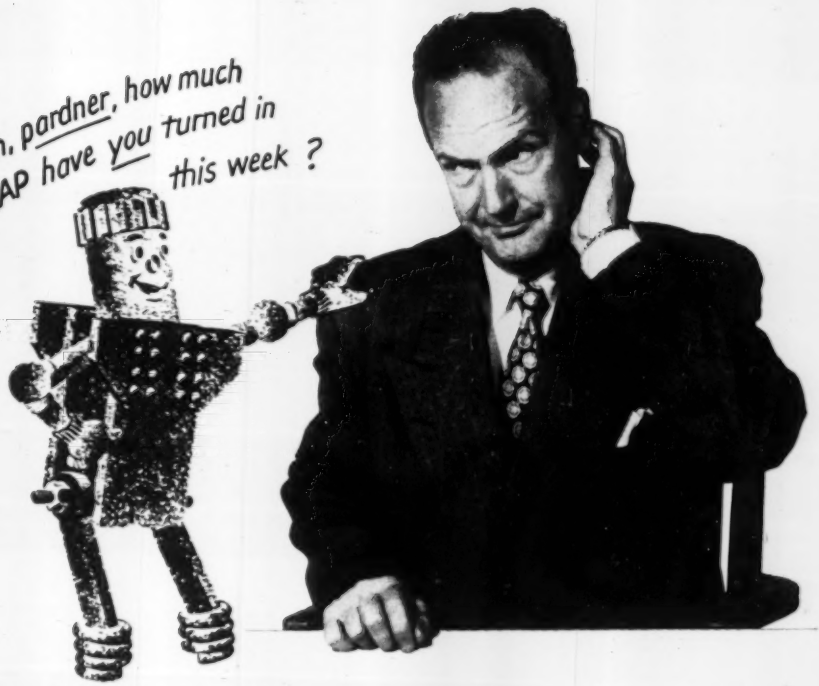
tion and rapid service. Among its features are pushbutton control for electric cranking, manual compression release and an electrically heated glow-plug for cold weather starting. Generator is driven by an improved four-cycle single-cylinder DSP diesel engine, incorporating increased power output and operating efficiency. In operation it uses approximately 0.155-gallon of low-cost furnace oil per kilowatt hour at full rated load.

Plant generates 115 v, 60 cycle, single-phase current; other ac models available in single phase produce 230 v and 115 to 230 v. A 32-v battery charging model is also supplied.

Centrifugal Casting Machine

USE REPLY CARD—CIRCLE No. 17

Production of large diameter, relatively short length castings is done on a face-plate type centrifugal casting machine, model R, made by Centrifugal Casting Machine Co., Box 947, Tulsa, Okla. A heavy duty ma-



Today, the steel business is your business

—*it needs all your SCRAP, Now!*

SUPPOSE that every steel user were suddenly told that he had to turn in a half-ton of scrap before he could get a ton of steel. It would start the most gosh-almighty treasure hunt for scrap that ever happened.

In effect, this "no-scrap, no-steel" situation virtually exists. For without *all* the scrap that industry can search out and start on its way to the mills, steel production will surely drop. It's as serious as that.

More scrap is urgently needed. Today the mills are turning out more steel than ever before. But they're scraping the bottom of the barrel as far as scrap is concerned. Defense and domestic demands for steel simply cannot be met unless at least 100,000 tons of "purchased" scrap roll into the furnaces—*every day.*

The bulk of this scrap must come from industry. That's why we're asking for your all-out help. That's why it's so important that you make the drive for scrap part of your daily operations. Make it your business to encourage every employee to report any obsolete, broken or worn-out machinery, tool or equipment that has seen its day. From this dormant "junk" must come the heavy melting scrap that the mills need most. Don't let your scrap lie idle; send it on its way. How about it, pardner?

You'll find your local scrap dealers listed in the yellow pages of the phone directory.

This page would ordinarily be used to tell you about

U·S·S STAINLESS STEEL

but, because without SCRAP we cannot produce steel, we are asking instead for your all-out help in getting more SCRAP to the mills.

AMERICAN STEEL & WIRE COMPANY, CLEVELAND
COLUMBIA STEEL COMPANY, SAN FRANCISCO · NATIONAL TUBE COMPANY, PITTSBURGH
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM · UNITED STATES STEEL COMPANY, PITTSBURGH
UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

1-1326

UNITED STATES STEEL

SPOT-Positioning

OF HEAVY MACHINERY is accomplished by... "Simple Fingerwork"

and this Magnetic Controlled

EUCLID CRANE

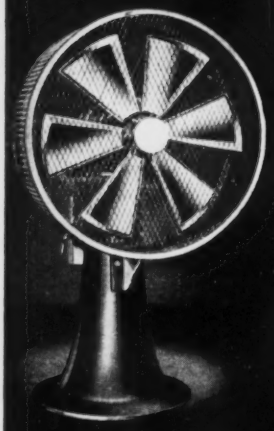
A simplified push-button system affords complete, precise floor control of handled loads on this 25-ton Euclid Crane.

A Frequency Relay Dynamic Lowering Control permits non-overhauling loads with empty or slightly loaded hook to start down slowly since weak "down power" is permissible.

Euclid Cranes are built in a range of styles and capacities to meet varied material handling needs. Write for information.

CRANES AND HOISTS
I Raise Profits

THE EUCLID CRANE & HOIST CO.
1364 CHARDON ROAD • EUCLID, OHIO



• Ruggedly made to withstand severe use .... advanced designing in fan blades .... rigidly mounted and securely locked in place .... well balanced and readily portable by overhead crane or auxiliary truck. Stationary and oscillating types with either pedestal (floor mounting) or bracket (wall mounting).

B. F. Perkins & Son, Inc.
HOLYOKE, MASSACHUSETTS
Manufacturers of Industrial Machinery Since 1873

PERKINS MAN COOLERS
TRADE MARK REGISTERED UNITED STATES PATENT OFFICE

chine, it accommodates molds up to 25,000 pounds and 40 inches in making castings up to 6 feet in diameter. It features water cooled shaft bearings in maintaining high production of heavy castings and is designed especially for production of jet engine centrifugal castings.

Porcelain-Like Enamel

USE REPLY CARD—CIRCLE No. 18

Designated as Porcelan-amel, a porcelain-like enamel, developed by United Lacquer Mfg. Corp., Linden, N. J., provides resistance to weather, chipping, abrasion, mechanical abuse, salt spray, alcohols and acid solutions. It is particularly useful for use in outdoor installations where atmosphere contains a high concentration of corrosive materials such as sulphur.

Magnetic Blowout Switches

USE REPLY CARD—CIRCLE No. 19

A series of small size magnetic blowout switches for use in switching high voltage direct current circuits is offered by Micro Switch, Freeport, Ill. They are of the same dimension as the company's standard precision switches for alternating current switching.

Antirust Paint

USE REPLY CARD—CIRCLE No. 20

Rust-Cure, an antirust paint that can be applied right over rust without wire brushing, scraping or sandblasting, is announced by Monroe Co. Inc., Cleveland, O. Available in black, aluminum and clear, it is suitable for both interior and exterior use on old or new metal. It is compounded for brush application and may be thinned with Rust-Cure solvent for spray use.

Bright Zinc Process

USE REPLY CARD—CIRCLE No. 21

Hanson-Van Winkle-Munning Co., Matawan, N. J., introduces a bright zinc process for still tank plating. It is based on the use of BSZ-300 brightener as an additive to the regular cyanide solution. It is claimed that parts plated by the new process stay bright longer and have high resistance to oxidation and tarnish.

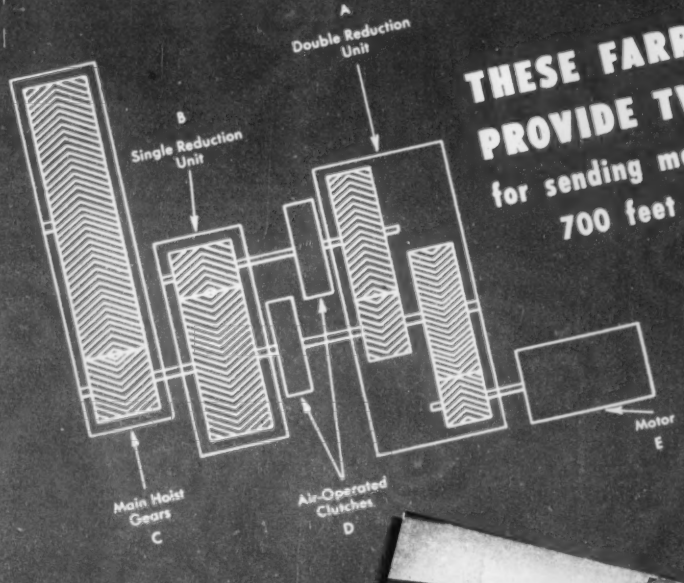
Eliminates Packing Glands

USE REPLY CARD—CIRCLE No. 22

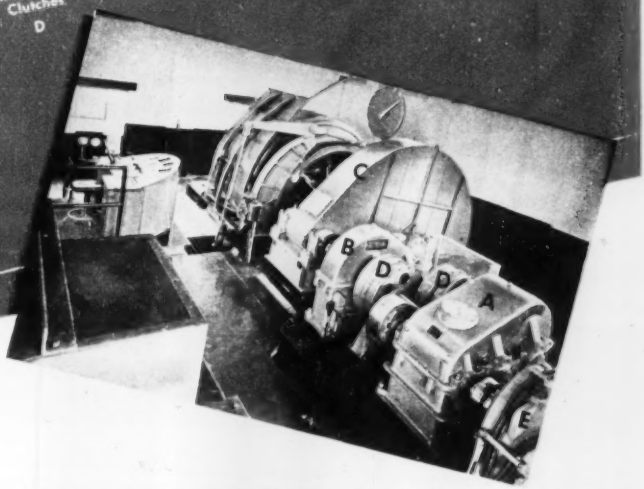
An acrylic plastic purge meter that eliminates packing glands and glass parts is a development of Brooks Rotameter Co., Lansdale, Pa. Known as Mite purge meter, it comes in four sizes with a range of 0.01 to

THESE FARREL GEARS PROVIDE TWO SPEEDS

for sending men and machines 700 feet underground



Schematic diagram of the Farrel gear drive for the new hoist at Mine 17 of Peabody Coal Company. The hoist was engineered and manufactured by Robert Holmes and Brothers, Inc., of Danville, Ill.



By actuating one or the other of two air-operated clutches, this mine hoist can be run at either of two speeds. For handling machinery at the lower speed, all of the Farrel gears are used to provide a total speed reduction of 144 to 1. For carrying men, the higher hoist speed is used by cutting out the single reduction unit and the second pair of gears of the double reduction unit, giving a speed ratio of 49 to 1.

Farrel-Sykes herringbone gears were selected for this installation because of their quiet, vibration-free performance and long-life dependability – qualities which result from extreme accuracy of tooth spacing, contour and helix angle, and other features inherent in the Farrel-Sykes method of gear generation. These gears are available in any size from ¼ inch to 20 feet diameter, for any application.

A Farrel engineer is ready to assist you in working out unusual gear problems. Why not send for him today?

FARREL-BIRMINGHAM COMPANY, INC. • Ansonia, Connecticut

Plants: Ansonia and Derby, Conn., Buffalo, N.Y.
Sales Offices: Ansonia, Buffalo, New York, Boston, Pittsburgh, Akron, Cleveland, Detroit, Chicago, Portland (Oregon), Los Angeles, Salt Lake City, Tulsa, Houston, New Orleans.

Farrel-Birmingham ®

FB-696

Electro
agrees:
It's Take-Off
That Pays Off
Whatever the *theory* of wheel quality, it's take-off that pays off. Currently, competitive tests prove that Electro Wheels *engineered to the job,* are 45% more effective!
As grinding problems and practices become more and more individual, production executives realize more and more that only those wheels that are engineered for specific purposes under individual conditions, are wholly satisfying.
Permission to survey the possibilities as to whether comparable efficiencies and economies can be achieved for you, will place you under no obligation whatever. Phone, write or wire. We'll get a competent Field Engineer to you quick!
Electro
SINCE 1919
Resin Bonded
ABRASIVE WHEELS FOR
CUTTING-OFF
PRECISION GRINDING
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GRINDING WHEEL MANUAL 645 AND SPEED CALCULATOR
Free on Request
Write For Them NOW!
E-400
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344 DELAWARE AVENUE • BUFFALO 2, NEW YORK
Plants: Buffalo, N. Y. Cap-de-la-Madeleine, P. Q. Canada · Regional Warehouse: Los Angeles 58, Cal.

54.0 gallons per hour of water and 0.2 to 216 cubic feet per hour of air. Rate of flow is visibly indicated by position of spherical float in metering tube.

Cord Set with Grounding Plug

USE REPLY CARD—CIRCLE No. 23

An 8-foot cord set with grounding plug to meet new NEMA standard is announced by Construction Materials Division, General Electric Co., Bridgeport 2, Conn. Set has a molded-on plug with a special round pin to provide positive third-wire grounding.

Barrel Finishing Compound

USE REPLY CARD—CIRCLE No. 24

Compound No. 1 double strength, introduced by Blue Magic Chemical Specialties Co., Philadelphia 24, Pa., is a special purpose chemical for barrel finishing brass, bronze, copper, gold and silver stampings, castings, machined and drawn parts. It is a highly concentrated paste that is used in small quantities and yields uniform metallic colors.

Welding Cable Connector

USE REPLY CARD—CIRCLE No. 25

An improved welding cable connector is available from Cam-Lok, division of Empire Products Inc., Cincinnati, O. It is made of solid brass machined to a smooth sliding fit. Design consists of a double cam principle where one cam exerts pressure parallel to axis of connector, the other perpendicular to the axis.

Screw and Driver

USE REPLY CARD—CIRCLE No. 26

Designed with a slight twist to the recess of its cross slotted head, the screw developed by Wesloc Screw Inc., Portland, Oreg., enables worker to drive it without application of downward pressure. The harder the screwdriver is turned the tighter it hugs the screw. The driver is easily centered and quickly removed. There is no slipping or kicking out.

Flag Type Solderless Terminal

USE REPLY CARD—CIRCLE No. 27

Flag type solderless terminal, made by Aircraft-Marine Products Inc., Harrisburg, Pa., can be installed with one stroke of a tool on standard wires in ranges from No. 22 to No. 10. Color coded plastic sleeve of high dielectric qualities is bonded to thin copper sleeve which is attached to terminal barrel. Bomb-tail end is formed under optimum temperatures and pressures to make intimate seal. Terminal is crimped to wire by plac-

COLUMBIA STEEL TANK CO. REPORTS THESE 3 ADVANTAGES

This Kansas City, Missouri, tank fabrication plant handles bulk storage tanks, structural members, truck tanks, flat sheet steel, angles, bars. Materials are handled in many sections of their plant yard. The same advantages they point out can pay dividends on your material handling jobs. Get the cost-cutting, labor-saving Lorain Crane story from your Thew-Lorain Distributor!

"Highly Adaptable to Loading . . ."

Columbia Steel Tank Co.'s Lorain handles just about every size, shape and type of steel that enters or leaves their plant. From flat sheets to bulky tanks, it does the job. Depending on your needs, you can equip your Lorain Crane with any of 16 or more lifting attachments — all interchangeable — for any lifting, loading, unloading or material handling duty.

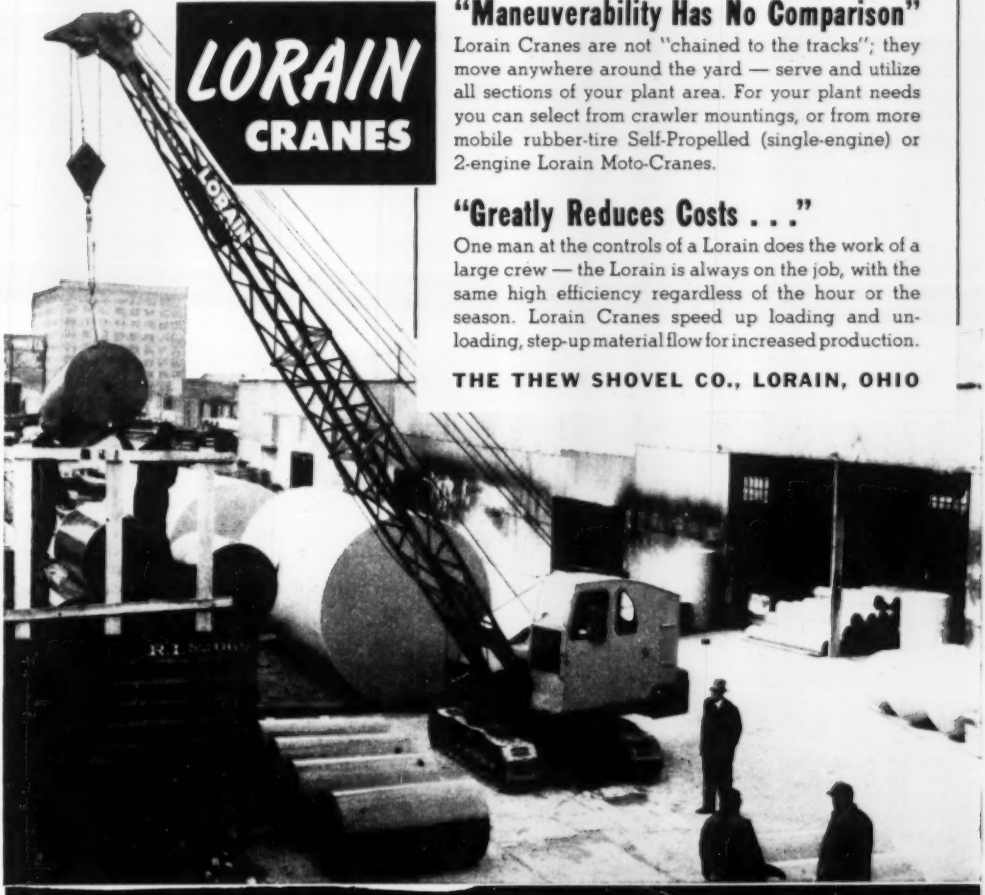
"Maneuverability Has No Comparison"

Lorain Cranes are not "chained to the tracks"; they move anywhere around the yard — serve and utilize all sections of your plant area. For your plant needs you can select from crawler mountings, or from more mobile rubber-tire Self-Propelled (single-engine) or 2-engine Lorain Moto-Cranes.

"Greatly Reduces Costs . . ."

One man at the controls of a Lorain does the work of a large crew — the Lorain is always on the job, with the same high efficiency regardless of the hour or the season. Lorain Cranes speed up loading and unloading, step-up material flow for increased production.

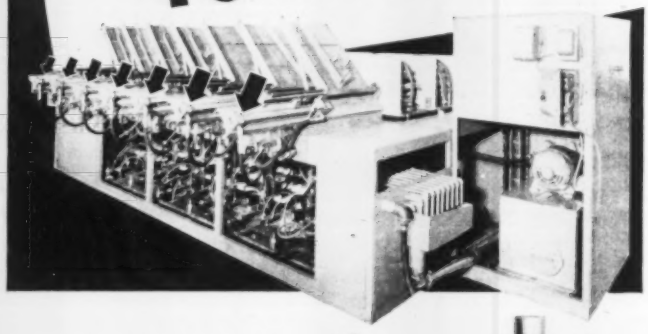
THE THEW SHOVEL CO., LORAIN, OHIO

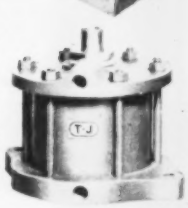


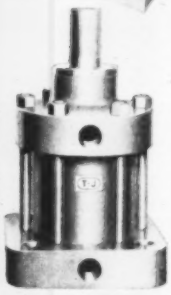
THEW LORAIN® CRANES FOR INDUSTRY

Job File No. 3259

Feeds Automatically WITH T-J CYLINDERS





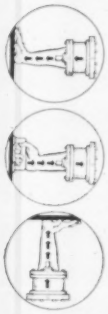


T-J Hydraulic Cylinders furnish efficient, automatic "push power" for feeding devices in this new Ajax-Northrup induction forge heating equipment.

This unit—manufactured by Ajax Electrothermic Corp., Trenton, N. J.—automatically heats steel forging stock in sizes ranging from 1 to 4 inches (rounds or squares) at 2250°F. at rate of 7500 to 8500 lbs. per hour. Has space for 8 heating stations . . . each with *hydraulically operated billet feeding devices employing T-J Cylinders.* These cylinders also eject heated bars automatically. Induction heating with this equipment results in uniformity of successive billets fed to the forge—thus controlling quality of finished forgings and reducing rejects.

Do you have a tough job in power movement—pushing, pulling or lifting? Let T-J help you *simplify machines, save labor* and *cut costs* by using T-J Air or Hydraulic Cylinders! Many standard sizes and styles . . . cushioned or non-cushioned . . . 100 lb. or 50,000 lb. Precision-built, long life. Write for more information. The Tomkins-Johnson Co., Jackson, Mich.

FOR POWER MOVEMENT IN ANY DIRECTION



100 LBS. or 50,000 LBS.

35 YEARS EXPERIENCE

TOMKINS-JOHNSON

RIVITORS...AIR AND HYDRAULIC CYLINDERS...CUTTERS...CLINCHORS

T-J

ing it end-on in special tool so entire body is confined during crimping cycle.

Tape Hook

USE REPLY CARD—CIRCLE No. 28

No. 514-C tape hook, made by L. S. Starrett Co., Athol, Mass., is designed for attachment to any of the company's ¼ or ⅜-inch wide steel tape. It facilitates unassisted measuring of long pipe, casings, steel sheets, etc.

Heavy Duty Dial Feed

USE REPLY CARD—CIRCLE No. 29

An electrically controlled, air-powered rotary work feeder with a 22-inch diameter table top is offered by Bellows Co., Akron, O. Model BRET-22 can be set to position four, six, nine, 12, 18 or 36 stations. It will position loads up to 1000 pounds quickly and accurately.

High Speed Steel Drill Rod

USE REPLY CARD—CIRCLE No. 30

Ace Drill Corp., Adrian, Mich., introduces a hardened and ground high speed steel drill rod in standard 36-inch lengths. Blanks are cut from treated stock and centerless ground. They are available as hardened, tempered and centerless ground in diameters from 3/32 to 1 inch, with a diameter tolerance of plus or minus 0.001-inch or as hardened and tempered only in sizes from 0.118 to 0.515-inch.

Self-Adjusting Sling

USE REPLY CARD—CIRCLE No. 31

Caldwell Co., Rockford, Ill., introduces Adjust-A-Leg equalizing sling. Sling consists of an equalizing unit and a wire rope sling. It is available in eight sizes ranging from ¾-ton to 15 tons.

Magnesium Safety Tongs

USE REPLY CARD—CIRCLE No. 32

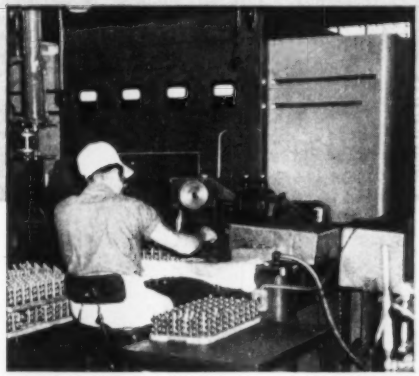
Magline Inc., Pinconning, Mich., announces an addition to its line of lightweight magnesium safety tongs that features a tapered nose unit designed to facilitate handling of small stock. They are designed to crush if accidentally caught within die opening.

Shank Type, Bull Nose Center

USE REPLY CARD—CIRCLE No. 33

Capacities up to 10 tons and head sizes up to 24 inches are claimed for the shank-type, bull nose RED-E center, announced by Ready Tool Co., Bridgeport, Conn. It is designed for extra heavy duty work with two single row, antifriction bearings.

Why MAYTAG uses RF HEATING for BETTER, FASTER, CHEAPER PRODUCTION



● The Maytag Company has found, for fast production at low cost and high quality, Westinghouse RF Heating installations are the answer.

The installation of a process using two 20 KW-450 KC generators—for both spline and straight shaft hardening—has paid for itself in *less than 3 months!* This was shortly after World War II, and since then, continued use has piled up real profit in savings.

In building a new plant for production of a completely new line of automatic washing machines, Maytag turned to induction heating for brazing and hardening . . . and they specified Westinghouse. A 50 KW and 10 KW RF generator, with associated work handling equipment, are now accounting for still further savings and continued high quality. That's why Maytag says that not only is the Westinghouse RF process the best method for heat treating production parts, but also "it produces precision work at the price of rough and ready work."

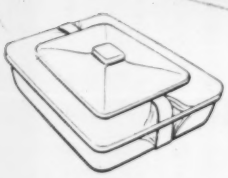
As we helped Maytag, let us help you solve your problems of increased production at low cost and with high quality. Investigate the possibilities of installing Westinghouse RF Heating now. Send for our Induction Heating case history book, B-4782. Write to Westinghouse Electric Corp., Dept. S-9, 2519 Wilkens Ave., Baltimore 3, Md.

J-02230

YOU CAN BE SURE ... IF IT'S

Westinghouse

INDUCTION HEATING

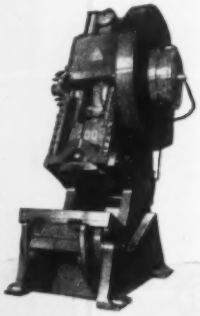


speeding the hand of the artificer

Silversmiths of another era wrought their beauties for the few who could pay for hours of delicate workmanship on each gleaming piece. Today, virtually all our people can enjoy possession of handsome table service, trays, and other examples of the art. Because the modern silversmith uses *presses*.

When you cut your costs by press methods you expand your market potential enormously. Often you improve appearance as well, for increased sales appeal. To find out if your product, whatever it may be, can benefit from these advantages, consult us without cost or obligation.

CLEARING MACHINE CORPORATION
6499 West 65th Street • Chicago 38, Illinois



One of several types of Clearing presses used in metal arts.

CLEARING PRESSES

THE WAY TO EFFICIENT MASS PRODUCTION

Bearings are shrunk on and spaced apart and preloaded for maximum radial and thrust capacities.

Barrel and Drum Cradle

USE REPLY CARD—CIRCLE No. 34

General Scientific Equipment Co., Philadelphia 32, Pa., offers a barrel and drum cradle with a loading bar that permits loading of drums with greater safety. It is designed for storing and draining of drums and barrels.

Electrode for Cast Iron Welds

USE REPLY CARD—CIRCLE No. 35

EutecTrode 26, developed by Eutectic Welding Alloys Corp., Flushing, N. Y., is an electrode for cast iron welding. It has a carbon content in the deposited metal that is evenly distributed.

High Temperature Control Valve

USE REPLY CARD—CIRCLE No. 36

Pacific Airmotive Corp., Burbank, Calif., announces a series of high temperature, high pressure, 400 cycle alternating current control valves. Sizes range from 2½ to 6-inch diameter. Valves handle 200 psi at 800° F air under either shut off or modulating requirements.

Cutting Compound

USE REPLY CARD—CIRCLE No. 37

Triple-Chip heavy duty antiweld soluble oil, developed by Motch & Merryweather Machinery Co., Cleveland 13, O., is recommended for heavy duty work uses. It withstands high heat, adheres to the tool, carries through to the cutting edge, mixes readily with water and resists contamination.

Bimetal Strip Thermostats

USE REPLY CARD—CIRCLE No. 38

Positive operating bimetal strip thermostats are available from Stevens Mfg. Co. Inc., Mansfield, O. Type CH100 units are sealed in a C-7 crystal can with terminals and leads covered by molded neoprene. They feature an electrically independent bimetal thermal element.

USE A
REPLY CARD
Just circle the corresponding number of any item in this section for more information.

Helpful Literature

74. Abrasive Belt Machines

Porter-Cable Machine Co.—Containing a factual description of abrasive belt machining and at same time serving as basic manual on subject is 28-page illustrated bulletin No. 400. Information on wet, dry and centerless belt grinders; contour grinding and polishing machines; backstand idlers; and bench and utility grinders is included.

75. Vacuum Accessories

Research Vacuum Supply Co.—40-page illustrated vacuum catalog 11 K lists high vacuum equipment; high vacuum pumps, oils and gages; and glass working machinery, including hand fires, torches, blast burners, needlepoint burners, cross-fires and miscellaneous supplies for glass blowing.

76. Record Photocopying

Remington Rand Inc. — Efficient means of visual sales supervision is offered in Dexigraph photocopy system described in 6-page folder D217 Sales progress is determined and future projects planned through comparison of past with present. Photocopies have wide margins for notes, and can be carried in pocket.

77. Dieless Duplicating

O'Niel-Irwin Mfg. Co.—Types of machines available for Di-Acro systems of dieless duplicating are listed and general information on features, advantages, and applications are presented along with specifications in 40-page illustrated catalog No. 51-17. Bending, notching, shearing and other equipment is covered.

78. Motor Controls

Clark Controller Co.—Information on line of Clark alternating and direct current motor starters, motor control centers, contactors, relays and other accessories is included in 88-page illustrated Controlog. Open and closed views, general descriptions, enclosure styles and outline dimensions are presented.

79. Industrial Lubricants

Alpha Corp.—Eight pages of industrial case histories describing the use of Molykote lubricants in applications including machine tools, dies, press fittings, threaded connections, taps, extra temperature lubrication, cold forming, cold heading and instruments can be found in bulletin 93.

80. Rolled Steel Products

Bethlehem Pacific Coast Steel Corp. —Catalog entitled "Bethlehem Pacific Rolled Steel Products" presents properties and sizes of sections rolled on individual mills of each of its three western steel plants. It also lists specialties such as special rolled sections, commodity listing of wire, fasteners and special analysis steels.

81. Handling Case Study

Baker-Raulang Co., Baker Industrial Truck Div.—2-page illustrated case study report No. 242 shows how Southern metalworking plant cuts overall costs 36 per cent after doubling wage rates by putting fork trucks to work.

82. Totally Enclosed Motors

Allis-Chalmers Mfg. Co. — Air-to-water heat exchangers are incorporated in totally-enclosed vertical and horizontal electric motors described in 4-page illustrated bulletin 05B7682. Enclosures keep out dust, dirt, fumes and excess moisture. Three types of cooler arrangements are covered.

83. Plastic Mold Steel

Carpenter Steel Co.—Selection, application and heat treament of steels for plastic molding is covered in 40-page book "Tooling Up for Plastics." What steel should be used, what is best hobbing procedure and other questions are answered. Many data are incorporated in mold steel selector table which is included.

84. Expanded Metal

Penn Metal Co.— Written on the theme "how to make a little metal go a long way," 24-page catalog No. 493 EM shows and suggests numerous applications of expanded metal meshes. Emphasis is placed on savings of steel and critical metals while still providing free passage of light and air, and accomplishing of decorative effects.

85. Welding Accessories

Hobart Brothers Co.—16-page illustrated catalog EW-164-S gives details of complete line of welding accessories which includes such items as protective headshields, goggles, visors, lens and cover glass, electrode holders, cable and accessories, work holders, cleaning tools, protective clothing, gloves and electrodes.

86. Small Gear Hobber

Hamilton Tool Co.—Designed expressly for high speed, continuous hobbing of small precision spur gears, pinions and special tooth forms, No. 00 gear hobber is described in detail in 4-page illustrated bulletin H-00-49.

FOR MORE INFORMATION USE ONE OF THESE CARDS . .

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87. Recording Galvanometers

Century Geophysical Corp.—Illustrated data sheet CGC-301 offers general information and specific characteristics of model 210 recording galvanometers. Models are available for natural frequencies from 100 to 3300 cycles per second.

88. Furnace Arches

Laclede Arch Co.—Details of construction of Laclede tile suspended arches are presented in 4-page illustrated data folder. Typical tile suspension as applied to open hearth furnaces is shown, and advantages are outlined.

89. Stamping Service

Laminated Shim Co., Stamping Div. —"Service in Stampings" is 12-page booklet prepared to give stampings purchasers data valuable in preparing specifications that will insure low quotations. Special company facilities are also treated.

90. Wire Straightener

Mettler Machine Tool, Inc.—Single page illustrated data sheet describes Shuster motor driven rotary wire straightener in sizes for wire diameters up to 3/16-in.

91. Acidproof Equipment

Fansteel Metallurgical Corp. — 28-page illustrated guide book "Fansteel Acidproof Tantalum Equipment for Chemical Operations" lists chemical and physical properties of tantalum and gives engineering descriptions of single and multiple tube bayonet heaters, coils, heat exchangers, condensers, hydrochloric acid absorbers, instrument protection, tubing and fittings.

92. Electric Wiring Conduit

American Brass Co.—4-page illustrated bulletin No. C-201 describes Sealtite liquid-tight electrical wiring conduit, plus giving specifications and application data. It can be cut to length for protection against moisture, oil, dirt, corrosive fumes and abrasion.

93. Forging Die Lubrication

Acheson Colloids Corp.—How a thin water emulsion of colloidal graphite acts as coolant and lubricant for hot-work dies is described in 4-page illustrated folder. Spray nozzles attached to frame of forging machine or recessed in dies can easily be automatically controlled.

94. Cutting Oil

Gulf Oil Corp.—8-page illustrated brochure AD-5614 describes advantages and properties of Electro cutting oil for heavy-duty machining jobs on all grades of carbon and alloy steels and tough nonferrous metals. Fluid contains both free sulphur and sulphurized mineral oil.

95. Casting Additive

International Nickel Co.—"Nisiloy for Gray Iron Castings" is title of 8-page illustrated bulletin which explains improved machinability, added toughness and increased resistance to wear which is imparted by this nickel-silicon additive to gray iron castings.

96. Induction Heating

Loftus Engineering Corp.—Induction heating of aluminum, magnesium, copper, brass and some applications of steel for forging, extrusion and rolling is function of 60-cycle induction heating furnace described in 4-page illustrated folder. Furnace uses Intertwin coil which assures uniform heating.

97. Linear Transducers

Automatic Temperature Control Co. —Engineering data sheets No. 55 and 56 describe and illustrate Atcotran differential transformers for use where accurate measurements of motion from few micro-inches up to 5 in. are required. Instruments will generate alternating current voltage signal directly proportional to position of armature from electrical center of wiring.

98. Buffing Compositions

Hanson-Van Winkle-Munning Co.— Line of buffing and polishing compositions for chromium plate and stainless steel are listed and described in bulletin C-100. Included are compounds 6-B-72 for use on high grade chromium finishes, 6-B-86 for plumbers' goods and auto accessories, 6-B-66 for general use and 6-B-97 for carbon or stainless steel use.

99. Induction Heating Units

Lindberg Engineering Co. — Electronic induction heating units in 5, 10 and 25-kw sizes are described in 8-page illustrated bulletin No. 1440. Equipment is described for heat treating, brazing, soldering and heating for forming as well as other operations.

100. Reinforced Resinoid Wheels

Bay State Abrasive Products Co.— 24-page illustrated catalog describes Bayflex, DuraCut and Saf-T-Cut reinforced resinoid products, made in disk wheels, straight wheels, mounted wheels and points and abrasive disks. Adaptors, back-up pads, and safety guards also are included. Chart compares characteristics, applications and other data of three types of products.

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11	31	51	71	91
12	32	52	72	92
13	33	53	73	93
14	34	54	74	94
15	35	55	75	95
16	36	56	76	96
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19	39	59	79	99
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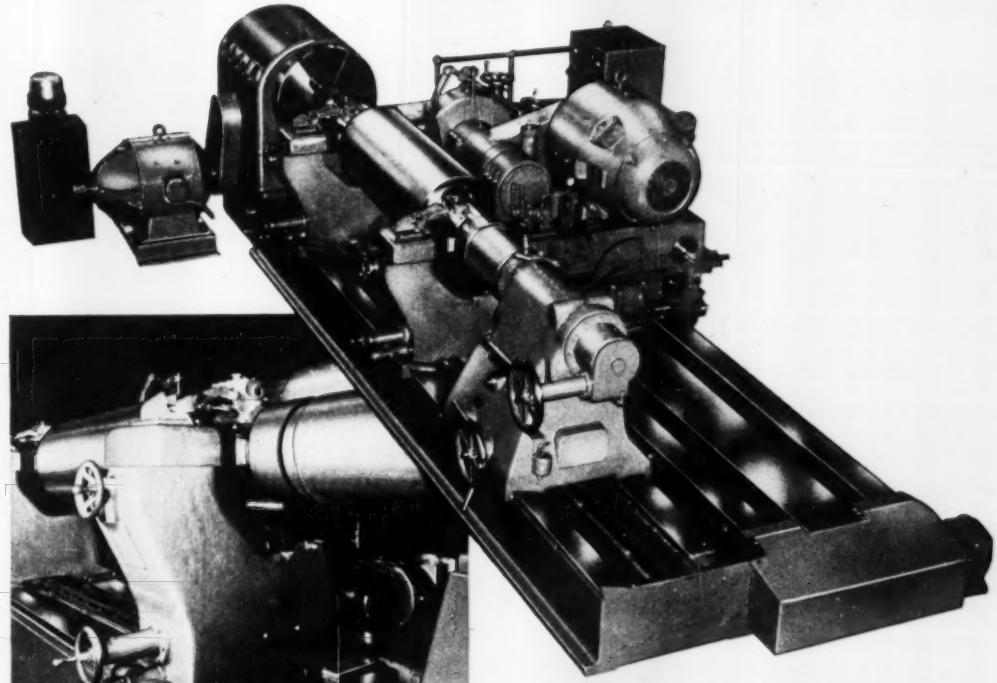

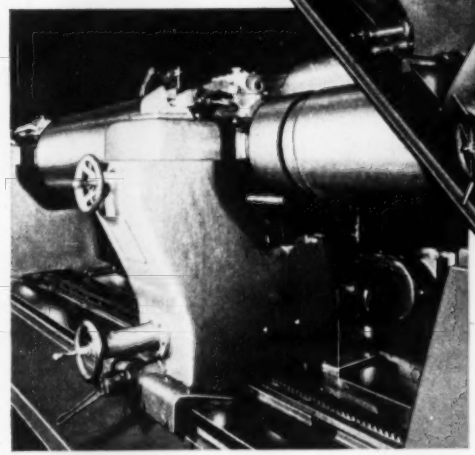

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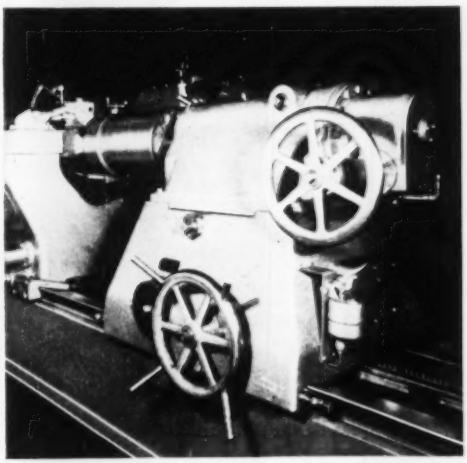
HEAVY-DUTY ROLL GRINDER

for steel and non-ferrous rolling mill applications



This massive, single wheel, double bed grinder —with the balance and accuracy of a jeweler's lathe—is designed to finish, to close tolerances, rolls up to 50" in diameter and 164" between centers. Another unit, now being produced, will handle rolls of 60" diameter and 408" between centers. Write for detailed information.

LOBDELL UNITED COMPANY

1836 WILMINGTON 99, DELAWARE 1951

A SUBSIDIARY OF UNITED ENGINEERING AND FOUNDRY COMPANY

METAL TESTS ARE MANY. X-Rays probe steel for hidden flaws. Ingenious devices measure its tensile strength, ductility, oxidation, corrosion, fatigue and other qualities. Adaptability of various alloys for electrical, thermal and mechanical needs are determined with modern engineering precision.

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The Market Outlook

STEEL producers anticipate better balance between supply and demand by mid-1952. But for the months immediately ahead they see no easing in the overall supply squeeze. Recent wildcat strikes at several large steelworks resulted in substantial tonnage losses. This will mean order carryover into first quarter next year will be larger than previously indicated. Last week a strike in the Birmingham district cost 7000 tons daily in lost production. This tonnage can never be made up and will force postponement of the time when production and consumption can be brought into balance despite new additions to producing facilities.

SUPPLY— Everything considered, prospects appear anything but promising for early improvement in general market conditions. Severe shortage of scrap is threatening sharp curtailment of production this winter. And to cap it all, defense requirements, swelling steadily as government programs get into full stride, will not reach peak until well into next year. In such circumstances, it is wishful thinking to anticipate any substantial change in the market situation soon. Even conditions in the light, flat-rolled products, for which demand has shown some softening, currently are tightening as heavier tonnages of semifinished steel are diverted to production of other products, particularly plates. Railroad steel requirements for 1952 are coming out. Last week the B. & O. ordered 100,000 tons of rail.

PRODUCTS— Of all the major products, plates, bars and shapes are in tightest supply. In plates, this is reflected in cutbacks in the freight car and shipbuilding programs. Heavy tonnages are being shipped to the petroleum and chemical industries, while requirements for combat tanks and other armament are rising steadily. Next to plates, the steelmakers consider bars in most stringent supply. On some of the larger sizes producers are far in arrears on deliveries. And with the opening of books for January tonnage on the basis of first-come first-served up to 10 per cent of scheduled production, hot carbon bar producers report themselves swamped with more orders than they can handle.

STRUCTURALS— Inquiry continues to decline in structurals. While fabricators are chiefly concerned with obtaining steel to care for work on their books, they are beginning to evince interest in their shrinking backlogs. Decline in inquiry stems largely from government restrictions on construction, and the trade feels the supply stringency in structurals reasonably soon will prove to be much less acute than Washington now believes to be the case. Some mills have had January sheet production restricted by diversion of semifinished supplies to production of plates. One large sheetmaker which recently opened books for second quarter for class B end-use products, has withdrawn from the market pending further developments. Pig iron supplies are more nearly equal to demand, reflecting the slowing down in some areas of the foundry trade.

PRICES— Except for revisions in the ceiling price schedule on metal castings, and effecting of higher prices on galvanized products to offset the recent 2-cent per pound increase in zinc, steel and related product prices are unchanged. Study of steel price structures, however, is being made by the Office of Price Stabilization. Indications are nothing will come of this pending settlement of wage negotiations in the industry scheduled to get going about Dec. 1. Generally, the trade anticipates steel prices will be increased in event steel wages are permitted to rise, though OPS has given no sign such is contemplated. Steel industry leaders are on record that wages cannot be increased without a corresponding boost in prices. In fact, they insist a price increase is warranted based on higher production costs over the past year, aside from wages.

PRODUCTION— Labor dispute in the Birmingham district prevented the steel industry from attaining scheduled operations last week. Production, nevertheless, rose. Estimated national ingot rate went up 1 point to 104 per cent of capacity.

NATIONAL STEELWORKS OPERATIONS

DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended Nov. 3	Change	Same Week 1950	Same Week 1949
Pittsburgh	101.5	— 0.5*	104	2
Chicago	108	+ 1.5*	106	5.5
Mid-Atlantic	101	+ 2	100	30
Youngstown	106	0	106	0
Wheeling	101.5	— 0.5	98	61
Cleveland	104	+ 3.5	97.5	0
Buffalo	104	0	29	32.5
Birmingham	60	—44	100	6
New England	90	0	91	58
Cincinnati	103	0	106	52
St. Louis	91	—12	88.5	91.5
Detroit	101.5	+ 0.5*	106	37
Western	105	+ 0.5	99	21.5
Estimated national rate	104	+ 1	98.5	12

Based on weekly steelmaking capacity of 1,909,034 tons for 1951; 1,928,721 tons for second half, 1950; 1,908,268 tons for first half, 1950; 1,843,516 tons for 1949.

*Change from revised rate for preceding week.

The Metalworking Outlook—p. 57 Production-Engineering News—p. 93

Composite Market Averages

FINISHED STEEL INDEX, Weighted:

	Nov. 1 1951	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.—100)	171.92	171.92	171.92	157.76	112.04
Index in cents per lb.	4.657	4.657	4.657	4.274	3.035

ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$106.32	$106.32	$106.32	$95.09	$64.45
No. 2 Fdry, Pig Iron, GT	52.54	52.54	52.54	49.35	28.17
Basic Pig Iron, GT	52.16	52.16	52.16	48.28	27.50
Malleable Pig Iron, GT	53.27	53.27	53.27	49.63	28.79
Steelmaking scrap, GT	43.00	44.00	44.00	41.67	19.17

Weighted finished steel index based on average shipments and Pittsburgh district prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Nov. 1 1951	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	3.70	3.70	3.70	3.45	2.50
Bars, H.R., Chicago	3.70	3.70	3.70	3.45	2.50
Bars, H.R., del. Philadelphia	4.223	4.223	4.223	3.93	2.86
Bars, C.F., Pittsburgh	4.55	4.55	4.55	4.15	3.10
Shapes, Std., Pittsburgh	3.65	3.65	3.65	3.40	2.35
Shapes, Std., Chicago	3.65	3.65	3.65	3.40	2.35
Shapes, del. Philadelphia	3.918	3.918	3.918	3.46	2.48
Plates, Pittsburgh	3.70	3.70	3.70	3.50	2.50
Plates, Chicago	3.70	3.70	3.70	3.50	2.50
Plates, Coatesville, Pa.	4.15	4.15	4.15	3.90	2.50
Plates, Sparrows Point, Md.	3.70	3.70	3.70	3.50	2.50
Plates, Claymont, Del.	4.15	4.15	4.15	3.90	2.50
Sheets, H.R., Pittsburgh	3.60-75	3.60-75	3.60-75	3.35	2.425
Sheets, H.R., Chicago	3.60	3.60	3.60	3.35	2.425
Sheets, C.R., Pittsburgh	4.35	4.35	4.35	4.10	3.275
Sheets, C.R., Chicago	4.35	4.35	4.35	4.10	3.275
Sheets, C.R., Detroit	4.55	4.55	4.55	4.30	3.375
Sheets, Galv., Pittsburgh	4.80	4.80	4.80	4.10	4.05
Strip, H.R., Pittsburgh	3.75-4.00	3.75-4.00	3.75-4.00	3.50-3.75	2.35
Strip, H.R., Chicago	3.50	3.50	3.50	3.25	2.35
Strip, C.R., Pittsburgh	4.65-5.35	4.65-5.35	4.65-5.35	4.15-4.85	3.05
Strip, C.R., Chicago	4.90	4.90	4.90	4.30	3.15
Strip, C.R., Detroit	4.85-5.60	4.85-5.60	4.85-5.60	4.35-4.95	3.15
Wire, Basic, Pittsburgh	4.85-5.10	4.85-5.10	4.85-5.10	4.50-4.75	3.05
Nails, Wire, Pittsburgh	5.90-6.20	5.90-6.20	5.90-6.20	5.30-5.60	3.75
Tin plate, box, Pittsburgh	$8.70	$8.70	$8.70	$7.50	$5.25

SEMIFINISHED

Billets, forging, Pitts. (NT)	$66.00	$66.00	$66.00	$63.00	$47.00
Wire rods, ⅜-⅝", Pitts.	4.10-30	4.10-30	4.10-30	3.85	2.30

PIG IRON, Gross Ton

Bessemer, Pitts.	$53.00	$53.00	$53.00	$47-$50	$29.00
Basic Valley	52.00	52.00	52.00	49.00	28.00
Basic, del. Phila.	56.61	56.61	56.61	53.39	29.93
No. 2 Fdry, Pitts.	52.50	52.50	52.50	49.50	28.50
No. 2 Fdry, Chicago	52.50	52.50	52.50	49.50	28.50
No. 2 Fdry, Valley	52.50	52.50	52.50	49.50	28.50
No. 2 Fdry, Del. Phila.	57.11	57.11	57.11	53.89	30.43
No. 2 Fdry, Birm.	48.88	48.88	48.88	45.88	24.88
No. 2 Fdry (Birm.) del. Cin.	55.49	55.49	55.49	52.58	28.94
Malleable Valley	52.50	52.50	52.50	49.50	28.50
Malleable, Chicago	52.50	52.50	52.50	46.50-49.50	28.50
Charcoal, Lyles, Tenn.	66.00	66.00	66.00	62.00	33.00
Ferromanganese, Etna, Pa.	188.00	188.00	188.00	175.00	140.00*

* Delivered, Pittsburgh.

SCRAP, Gross Ton (including broker's commission)

No. 1 Heavy Melt., Pitts.	$44.00	$44.00	$45.00	$44.00	$26.00
No. 1 Heavy Melt., E. Pa.	42.50	42.50	43.50	41.00	18.75
No. 1 Heavy Melt., Chicago	42.50	42.50	43.50	40.00	18.75
No. 1 Heavy Melt., Valley	44.00	44.00	45.00	43.75*	26.00
No. 1 Heavy Melt., Cleve.	43.00	43.00	44.00	43.25	19.50
No. 1 Heavy Melt., Buffalo	43.00	43.00	44.00	41.50	19.25
Rails, Rerolling, Chicago	52.50	52.50	52.50	64.50	22.25
No. 1 Cast, Chicago	49.00*	49.00*	49.00*	53.50	26.00

* F.o.b. shipping point.

COKE, Net Ton

Beehive, Furn., Connlsvl.	$14.75	$14.75	$14.75	$14.25	$8.75
Beehive, Fdry., Connlsvl.	17.50	17.50	17.50	16.50	9.50
Oven Fdry., Chicago	23.00	23.00	23.00	21.00	14.35

NONFERROUS METALS

Copper, del. Conn.	24.50	24.50	24.50	24.50	14.375
Zinc, E. St. Louis	19.50	19.50	19.50	17.50	9.25
Lead, St. Louis	18.80	18.80	18.80	16.80	8.10
Tin, New York	103.00	103.00	103.00	131.00	52.00
Aluminum, del.	19.00	19.00	19.00	19.00	15.00
Antimony, Laredo, Tex.	42.00	42.00	42.00	32.00	14.50
Nickel, refinery, duty paid	56.50	56.50	56.50	48.00	35.00

PIG IRON

F.o.b. furnace prices quoted under GCPR as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax. Key to producing companies published on second following page.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa. B2	$54.00	$54.00	$55.00	$55.50
Brooklyn, N. Y., del.	....	59.18	59.68	....
Newark, del.	56.87	57.37	57.87	58.37
Philadelphia, del.	56.61	57.11	57.61	58.11
Birmingham District				
Alabama City, Ala., R2	48.38	48.88	....	....
Birmingham R2	48.38	48.88	....	....
Birmingham S9	48.38	48.88	....	....
Woodward, Ala. W15	48.38	48.88	....	....
Cincinnati, del.	....	55.49	....	....
Buffalo District				
Buffalo R2	52.00	52.50	53.00	....
Buffalo H1	52.00	52.50	53.00	....
Tonawanda, N.Y. W12	52.00	52.50	53.00	....
No. Tonawanda, N.Y. T9	....	52.50	53.00	....
Boston, del.	62.11	62.61	63.11	....
Rochester, N.Y. del.	54.88†	55.38†	55.88†	....
Syracuse, N.Y., del.	55.91†	56.41†	56.91†	....
Chicago District				
Chicago I-3	52.00	52.50	52.50	53.00
Gary, Ind. U5	52.00	....	52.50	....
Indiana Harbor, Ind. I-2	52.00	....	52.50	....
So. Chicago, Ill. W14	52.00	52.50	52.50	....
So. Chicago, Ill. Y1	52.00	52.50	52.50	....
So. Chicago, Ill. U5	52.00	....	52.50	53.00
Milwaukee, del.	54.06	54.56	54.56	55.06
Muskegon, Mich., del.	....	58.47	58.47	....
Cleveland District				
Cleveland A7	52.00	52.50	52.50	53.00
Cleveland R2	52.00	52.50	52.50	....
Akron, O., del. from Cleve.	54.61	55.11	55.11	55.61
Lorain, O. N3	52.00	....	....	53.00
Duluth I-3	....	....	52.50	....
Erie, Pa. I-3	52.00	52.50	52.50	53.00
Everett, Mass. E1	....	57.00	57.50	....
Fontana, Calif. K1	58.00	58.50	....	....
Geneva, Utah G1	52.00	52.50	....	....
Seattle, Tacoma, Wash., del.	....	60.66	....	....
Portland, Oreg., del.	....	60.66	....	....
Los Angeles, San Francisco, del.	60.16	60.66	....	....
Granite City, Ill. G4	53.90	54.40	54.90	....
St. Louis, del. (inc. tax‡)	54.66	55.16	55.66	....
Ironton, Utah C11	52.00	52.50	....	....
Lone Star, Tex. L6	48.00	*48.50	48.50	....
Minnequa, Colo. C10	54.00	55.00	55.00	....
Pittsburgh District				
Neville Island, Pa. P6	....	52.50	52.50	53.00
Pitts., N.&S. sides, Ambridge, Aliquippa, del.	....	53.80	53.80	54.30
McKees Rocks, del.	....	53.54	53.54	54.04
Lawrenceville, Homestead, McKeesport, Monaca, del.	....	54.07	54.07	54.57
Verona, del.	....	54.57	54.57	55.07
Brackenridge, del.	....	54.82	54.82	55.32
Bessemer, Pa. U5	52.00	....	52.50	53.00
Clairton, Rankin, So. Duquesne, Pa. U5	52.00	....	....	....
McKeesport, Pa. N3	52.00	....	....	53.00
Monessen, Pa. P7	54.00	....	....	....
Sharpsville, Pa. S6	....	....	52.50	53.00
Steelton, Pa. B2	54.06	54.50	55.00	55.50
Swedeland, Pa. A3	56.00	56.50	57.00	57.50
Toledo, O. I-3	52.00	52.50	52.50	53.00
Cincinnati, del.	57.47	57.97	....	....
Troy, N.Y. R2	54.00	54.50	55.00	55.50
Youngstown District				
Hubbard, O. Y1	52.00	52.50	52.50	....
Youngstown Y1	52.00	52.50	52.50	....
Youngstown U5	52.00	....	....	53.00
Mansfield, O., del.	56.65	57.15	57.15	57.65

* Low phos, southern grade. † Preliminary.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.60% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.50 for each 0.5% Si)

Jackson, O. G2, J1	$62.50
Buffalo H1	63.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for each 0.045% max. P)

Niagara Falls, N.Y. P15	$88.00
Keokuk, Iowa, Openhearth & Fdry. frt. allowed K2	92.50
Keokuk, OH & Fdry., 12½ lb piglets, 16% Si, frt. allowed K2	95.50
Wenatchee, Wash., O.H. & Fdry., frt. allowed K2	92.50

CHARCOAL PIG IRON, Gross Ton

(Low phos semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles, Tenn. T3	$66.00

LOW PHOSPHOROUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$57.00
Steelton, Pa. B2	60.00
Philadelphia delivered	63.37
Troy, N.Y. R2	60.00

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Semifinished and Finished Steel Products

Mill prices quoted under GCPR as reported to STEEL, Nov. 1, 1951; cents per pound except as otherwise noted. Changes shown in *Italics*.
Code numbers following mill points indicate producing company; key on next two pages

INGOTS, Carbon, Forging (NT)
Fontana,Calif. K1 ....$79.00
Munhall,Pa. U5 .....52.00

INGOTS, Alloy (NT)
Detroit R7 .....$54.00
Fontana,Calif. K1 ....80.00
Houston,Tex. S5 .....62.00
Midland,Pa. C18 .....54.00
Munhall,Pa. U5 .....54.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ....$56.00
Clairton,Pa. U5 .....56.00
Ensley,Ala. T2 .....56.00
Fairfield,Ala. T2 .....56.00
Fontana,Calif. K1 ....75.00
Gary,Ind. U5 .....56.00
Johnstown,Pa. B2 .....56.00
Lackawanna,N.Y., B2 ..56.00
Munhall,Pa. U5 .....56.00
So.Chicago,Ill. U5 ....56.00
So.Duquesne,Pa. U5 ....56.00
Carbon, Forging (NT)
Bessemer,Pa. U5 ....$66.00
Buffalo R2 .....66.00
Canton,O. R2 .....66.00
Clairton,Pa. U5 .....66.00
Cleveland R2 .....66.00
Conshohocken,Pa. A3 ..73.00
Detroit R7 .....69.00
Ensley,Ala. T2 .....66.00
Fairfield,Ala. T2 .....66.00
Fontana,Calif. K1 ....85.00
Gary,Ind. U5 .....66.00
Geneva,Utah G1 .....66.00
Houston,Tex. S5 .....74.00
Johnstown,Pa. B2 .....66.00
Lackawanna,N.Y. B2 ..66.00
LosAngeles B3 .....85.00
Munhall,Pa. U5 .....66.00
Seattle B3 .....85.00
So.Chicago R2,U5,W14 ..66.00
So.Duquesne,Pa. U5 ....66.00
So.SanFrancisco B3 ....85.00
Alloy, Forging (NT)
Bethlehem,Pa. B2 ....$70.00
Buffalo R2 .....70.00
Canton,O. R2 .....70.00
Canton,O.(29) T7 .....66.00
Conshohocken,Pa. A3 ..77.00
Detroit R7 .....73.00
Fontana,Calif. K1 ....89.00
Gary,Ind. U5 .....70.00
Houston,Tex. S5 .....78.00
Ind.Harbor,Ind. Y1 ....70.00
Johnstown,Pa. B2 .....70.00
Lackawanna,N.Y. B2 ....70.00
LosAngeles B3 .....90.00
Massillon,O. R2 .....70.00
Midland,Pa. C18 .....70.00
Munhall,Pa. U5 .....70.00
So.Chicago R2,U5,W14 ..70.00
So.Duquesne,Pa. U5 ....70.00
Struthers,O. Y1 .....70.00
Warren,O. C17 .....70.00

ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 .....$82.00
Cleveland R2 .....82.00
Fontana,Calif. K1 ....103.00
Gary,Ind. U5 .....82.00
Massillon,O. R2 .....82.00
So.Chicago, Ill. R2 .....82.00
So.Duquesne,Pa. U5 ....82.00

SHEET BARS (NT)
Fontana,Calif. K1 ....$89.00

SKELP
Aliquippa,Pa. J5 .....$3.45
Munhall,Pa. U5 .....3.35
Warren,O. R2 .....3.35
Youngstown, R2, U5 ....3.35

WIRE RODS
Alton, Ill. 4.40
AlabamaCity,Ala. R2 ....4.10
Buffalo W12 .....4.10
Cleveland A7 .....4.10
Donora,Pa. A7 .....4.10
Fairfield,Ala. T2 .....4.10
Fontana,Calif. K1 .....4.90
Houston,Tex. S5 .....4.50
Johnstown,Pa. B2 .....4.10
Joliet,Ill. A7 .....4.10
LosAngeles B3 .....4.90
Minnequa,Colo. C10 ....4.35
Monessen,Pa. P7 .....4.30
No.Tonawanda,N.Y.B11 ..4.10
Pittsburg,Calif. C11 ....4.75
Portsmouth,O. P12 .....4.30
Roebling,N.J. R5 .....4.20
So.Chicago,Ill. R2 .....4.10
SparrowsPoint,Md. B2 ....4.20
Sterling,Ill.(1) N15 .....4.10
Struthers,O. Y1 .....4.10
Torrance,Calif. C11 .....4.90
Worcester,Mass. A7 .....4.40

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 ....4.45
Lackawanna,N.Y. B2 ....4.45
Munhall,Pa. U5 .....4.45
So.Chicago,Ill. U5 .....4.45

STRUCTURALS
Carbon Steel Stand. Shapes
AlabamaCity,Ala. R2 ...3.60
Aliquippa,Pa. J5 .....3.65
Bessemer,Ala. T2 .....3.65
Bethlehem,Pa. B2 .....3.70
Clairton,Pa. U5 .....3.65
Fairfield,Ala. T2 .....3.65
Fontana,Calif. K1 .....4.25
Gary,Ind. U5 .....3.65
Geneva,Utah G1 .....3.65
Houston,Tex. S5 .....4.05
Ind.Harbor,Ind. I-2 ....3.65
Johnstown,Pa. B2 .....3.70
KansasCity,Mo. S5 .....4.25
Lackawanna,N.Y. B2 ....3.70
LosAngeles B3 .....4.25
Minnequa,Colo. C10 .....4.10
Munhall,Pa. U5 .....3.65
Niles,Calif.(22) P1 .....4.85
Phoenixville,Pa. P4 .....6.25
Portland,Oreg. O4 .....4.50
Seattle B3 .....4.30
So.Chicago,Ill. U5,W14 ..3.65
So.SanFrancisco B3 .....4.20
Torrance,Calif. C11 .....4.25
Weirton,W.Va. W6 .....3.90
Alloy Stand. Shapes
Clairton,Pa. U5 .....4.35
Fontana,Calif. K1 .....5.55
Munhall,Pa. U5 .....4.35
So.Chicago,Ill. U5 .....4.35
H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 .....5.50
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa.(14) B2 ..5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 .....6.10
Gary,Ind. U5 .....5.50
Geneva,Utah G1 .....5.50
Ind.Harbor,Ind. I-2 ....5.50
Ind.Harbor,Ind. Y1 .....6.00
Johnstown,Pa. B2 .....5.50
Lackawanna,N.Y.(14)B2 ..5.50
LosAngeles B3 .....6.05
Munhall,Pa. U5 .....5.50
Seattle B3 .....6.10
So.Chicago,Ill. U5 .....5.50
So.SanFrancisco B3 .....6.00
Struthers,O. Y1 .....6.00
Wide Flange
Bethlehem,Pa. B2 .....3.70
Clairton,Pa. U5 .....3.65
Fontana,Calif. K1 .....4.65
Lackawanna,N.Y. B2 ....3.70
Munhall,Pa. U5 .....3.65
So.Chicago,Ill. U5 .....3.65
H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....5.50
Lackawanna,N.Y. B2 ....5.50
Munhall,Pa. U5 .....5.45
So.Chicago,Ill. U5 .....5.45
BEARING PILES
Munhall,Pa. U5 .....3.65
So.Chicago,Ill. U5 .....3.65
PLATES, High-Strength Low-Alloy
Aliquippa,Pa. J5 .....5.65
Bessemer,Ala. T2 .....5.65
Clairton,Pa. U5 .....5.65
Cleveland J5, R2 .....5.65
Conshohocken,Pa. A3 ....5.90
Fairfield,Ala. T2 .....5.65
Fontana,Calif.(30) K1 ...6.25
Gary,Ind. U5 .....5.65
Geneva,Utah G1 .....5.65
Ind.Harbor,Ind. I-2 ....5.65
Ind.Harbor,Ind. Y1 .....6.15
Johnstown,Pa. B2 .....5.65
Munhall,Pa. U5 .....5.65
Pittsburgh J5 .....5.65
Seattle B3 .....6.55
Sharon,Pa. S3 .....5.70
So.Chicago,Ill. U5 .....5.65
SparrowsPoint,Md. B2 ....5.65
Warren,O. R2 .....5.65
Youngstown Y1 .....6.15
PLATES, Open-Hearth Alloy
Claymont,Del. C22 .....4.85
Coatesville,Pa. L7 .....5.25
Conshohocken,Pa. A3 ....5.05
Fontana,Calif. K1 .....5.70
Gary,Ind. U5 .....4.75
Johnstown,Pa. B2 .....4.75
Munhall,Pa. U5 .....4.75
Sharon,Pa. S3 .....5.20
So.Chicago,Ill. U5 .....4.75
SparrowsPoint,Md. B2 ....4.75
FLOOR PLATES
Cleveland J5 .....4.75
Conshohocken,Pa. A3 ....4.75
Harrisburg,Pa. C5 .....5.95
Ind.Harbor,Ind. I-2 ....4.75
Munhall,Pa. U5 .....4.75
So.Chicago,Ill. U5 .....4.75
PLATES, Ingot Iron
Ashland,Ic(15) A10 ....3.95
Ashland,Ic(15) A10 .....4.45
Cleveland,c.i. R2 .....4.30
Warren,O.c.i. R2 .....4.30

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ...3.70
Aliquippa,Pa. J5 .....3.70
Ashland,Ky. (15) A10 ...3.70
Bessemer,Ala. T2 .....3.70
Clairton,Pa. U5 .....3.70
Claymont,Del. C22 .....4.15
Cleveland J5, R2 .....3.70
Coatesville,Pa. L7 .....4.15
Conshohocken,Pa. A3 ....4.15
Fairfield,Ala. T2 .....3.70
Fontana,Calif.(30) K1 ...4.30
Gary,Ind. U5 .....3.70
GraniteCity,Ill. G4 .....4.40
Geneva,Utah, G1 .....3.70
Harrisburg,Pa. C5 .....4.75
Houston,Tex. S5 .....4.10
Ind.Harbor,Ind. I-2, Y1 .3.70
Johnstown,Pa. B2 .....3.70
Lackawanna,N.Y. B2 ....3.70
Minnequa,Colo. C10 .....4.50
Munhall,Pa. U5 .....3.70
Pittsburgh J5 .....3.70
Seattle B3 .....4.60
Sharon,Pa. S3 .....3.95
So.Chicago,Ill. U5, W14 .3.70
SparrowsPoint,Md. B2 ....3.70
Steubenville,O. W10 .....3.70
Warren,O. R2 .....3.70
Weirton,W.Va. W6 .....4.00
Youngstown R2, U5, Y1 .3.70
PLATES, Carbon A.R.
Fontana,Calif. K1 .....5.45
Geneva,Utah G1 .....4.85
PLATES, Wrought Iron
Economy,Pa. B14 .....8.60
BA"S, Hot-Rolled Carbon
AlabamaCity,Ala. R2 ....3.70
Aliquippa,Pa. J5 .....3.70
Alton,Ill. L1 .....4.15
Atlanta,Ga. A11 .....4.25
Bessemer,Ala. T2 .....3.70
Buffalo R2 .....3.70
Canton,O. R2 .....3.70
Clairton,Pa. U5 .....3.70
Cleveland R2 .....3.70
Detroit R7 .....3.85
Emeryville,Calif. J7 .....4.45
Fairfield,Ala. T2 .....3.70
Fontana,Calif. K1 .....4.40
Gary,Ind. U5 .....3.70
Houston,Tex. S5 .....4.10
Ind.Harbor,Ind. I-2, Y1 .3.70
Johnstown,Pa. B2 .....3.70
KansasCity,Mo. S5 .....4.30
Lackawanna,N.Y. B2 ....3.70
LosAngeles B3 .....4.40
Milton,Pa. B6 .....4.20
Minnequa,Colo. C10 .....4.15
Niles,Calif. P1 .....5.05
N.Tonawanda,N.Y. B11 ..3.70
Pittsburg,Calif. C11 .....4.40
Pittsburgh J5 .....3.70
Portland,Oreg. O4 .....4.65
Seattle B3, N14 .....4.45
So.Chicago R2,U5,W14 ..3.70
So.Duquesne,Pa. U5 ....3.70
So.SanFran.,Cal. B3 ....4.45
Struthers,O. Y1 .....3.70
Torrance,Calif. C11 .....4.40
Weirton,W.Va. W6 .....3.85
Youngstown R2, U5 .....3.70
BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 370
Atlanta A11 .....4.25
Johnstown,Pa. B2 .....3.70
Lackawanna,N.Y. B2 ....3.70
Niles, Calif. P1 .....5.05
Portland,Oreg. O4 .....4.65
SanFrancisco S7 .....4.85
BAR SIZE ANGLES; H.R. CARBON
Bethlehem,Pa. B2 .....3.90
BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 .....4.30
Buffalo R2 .....4.30
Canton,O. R2 .....4.30
Canton,O.(29) T7 .....3.95
Clairton,Pa. U5 .....4.30
Detroit R7 .....4.45
Ecorse,Mich. G5 .....4.65
Fontana,Calif. K1 .....5.35
Gary,Ind. U5 .....4.30
Houston,Tex. S5 .....4.70
Ind.Harbor,Ind. I-2, Y1 .4.30
Johnstown,Pa. B2 .....4.30
KansasCity,Mo. S5 .....4.90
Lackawanna,N.Y. B2 ....4.30
LosAngeles B3 .....5.35
Massillon,O. R2 .....4.30
Munhall,Pa. U5 .....4.30
So.Chicago R2,U5,W14 ..4.30
So.Duquesne,Pa. U5 ....4.30
Struthers,O. Y1 .....4.30
Warren,O. C17 .....4.30
Youngstown U5 .....4.30
BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 .....4.55
Gary,Ind. U5 .....4.55
Youngstown U5 .....4.55

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy
Aliquippa,Pa. J5 .....5.55
Bessemer,Ala. T2 .....5.55
Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.55
Cleveland R2 .....5.55
Fairfield,Ala. T2 .....5.55
Fontana,Calif. K1 .....6.60
Gary,Ind. U5 .....5.55
Ind.Harbor,Ind. I-2 .....5.55
IndianaHarbor,Ind. Y1 ...6.05
Johnstown,Pa. B2 .....5.55
Lackawanna,N.Y. B2 ....5.55
Los Angeles B3 .....6.25
Pittsburgh J5 .....5.55
Seattle B3 .....6.30
So.Duquesne,Pa. U5 ....5.55
So.SanFrancisco B3 ....6.30
Struthers,O. Y1 .....6.05
Youngstown U5 .....5.55
BARS, Cold-Finished Carbon
Ambridge,Pa. W18 .....4.55
BeaverFalls,Pa. M12,R2 .4.55
Buffalo B5 .....4.60
Camden,N.J. P13 .....5.00
Carnegie,Pa. C12 .....4.55
Chicago W18 .....4.55
Cleveland A7, C20 .....4.55
Detroit P17 .....4.70
Donora,Pa. A7 .....4.55
Elyria,O. W8 .....4.55
FranklinPark,Ill. N5 .....4.55
Gary,Ind. U5 .....4.55
GreenBay, Wis. F7 .....4.55
Hammond,Ind. L2, M13 .4.55
Hartford,Conn. R2 .....5.10
Harvey,Ill. B5 .....4.55
LosAngeles R2 .....6.00
Mansfield,Mass. B5 .....5.10
Massillon,O. R2, R8 .....4.55
Monaca, Pa. S17 .....4.55
Newark,N.J. W18 .....5.00
Plymouth,Mich. P5 .....4.80
Pittsburgh J5 .....4.55
Putnam,Conn. W18 .....5.10
Readville,Mass. C14 .....5.10
St. Louis,Mo. M3 .....4.95
So.Chicago,Ill. W14 .....4.55
SpringCity,Pa.(5) K3 ....5.00
Struthers,O. Y1 .....4.55
Waukegan,Ill. A7 .....4.55
Youngstown F3, Y1 .....4.55
BARS, Cold-Finished Alloy
Ambridge,Pa. W18 .....5.40
BeaverFalls,Pa. M12 .....5.40
Bethlehem,Pa. B2 .....5.40
Buffalo B5 .....5.40
Camden,N.J. P13 .....5.80
Canton,O. R2 .....5.40
Canton,O.(29) T7 .....4.90
Carnegie,Pa. C12 .....5.40
Chicago W18 .....5.40
Cleveland A7 .....5.45
Cleveland C20 .....5.40
Detroit P17 .....5.55
Donora,Pa. A7 .....5.45
Elyria,O. W8 .....5.40
Gary,Ind. R2 .....5.40
Hammond,Ind. L2, M13 ..5.40
Hartford,Conn. R2 .....5.85
Harvey,Ill. B5 .....5.40
Lackawanna,N.Y. B2 .....5.40
Mansfield,Mass. B5 .....5.85
Massillon,O. R2, R8 .....5.40
Midland,Pa. C18 .....5.40
Monaca,Pa. S17 .....5.40
Newark,N.J. W18 .....5.75
Plymouth,Mich. P5 .....5.60
So.Chicago,Ill. R2, W14 .5.40
Struthers,O. Y1 .....5.40
Warren,O. C17 .....5.40
Waukegan,Ill. A7 .....5.45
Worcester,Mass. A7 .....5.75
Youngstown U5, Y1 .....5.40
RAIL STEEL BARS
Chicagolfts.(3,4) C2 ....4.75
Chicagolfts (3,4) I-2 ....4.75
Franklin,Pa. (3,4) F5 ....4.75
FortWorth,Tex(26) T4 ....4.85
Huntngtn,W.Va.(3) W7 ....5.50
Marion,O.(3) P11 .....4.75
Moline,Ill.(3) R2 .....3.80
Tonawanda (3,4) B12 ....4.75
Williamsport(3) S19 .....5.00
Williamsport(4) S19 .....5.10
BARS, Wrought Iron
Dover,N.J. (Staybolt)U1 15.00
Dover,(End Bolt) U1 ....13.50
Dover,(Wrgt.Iron) U1 ....12.25
Economy,Pa. (S.R.) B14 .9.60
Economy,Pa.(D.R.)B14 ...11.90
Economy,(Staybolt)B14 ...12.20
McK.Rks.(Staybolt) L5 ...14.50
McK.Rks.(S.R.) L5 .....9.60
McK.Rks.(D.R.) L5 .....13.00
BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 .....3.70
Atlanta A11 .....4.25
Buffalo R2 .....3.70
Cleveland R2 .....3.70
Emeryville,Calif. J7 .....4.45
Fairfield,Ala. T2 .....3.70
Fontana,Calif. K1 .....4.40
Gary,Ind. U5 .....3.70
Ind.Harbor,Ind. I-2, Y1..3.70
Johnstown,Pa. B2 .....3.70
KansasCity,Mo. S5 .....4.30
Lackawanna,N.Y. B2 ....3.70
Los Angeles B3 .....4.40
Milton,Pa. B6 .....4.20
Minnequa,Colo. C10 .....4.15
Niles,Calif. P1 .....5.05
Pittsburg,Calif. C11 .....4.40
Pittsburgh J5 .....3.70
Portland,Oreg. O4 .....4.65
Seattle B3, N14 .....4.45
So.Chicago R2,U5,W14 ..3.70
So.Duquesne,Pa. U5 ....3.70
So.SanFran.,Cal. B3 ....4.45
Struthers,O. Y1 .....3.70
Torrance,Calif. C11 .....4.40
Warren,O. R2 .....3.70
Weirton,W.Va. W6 .....3.85
Youngstown R2, U5 .....3.70
SHEETS, H.R., (19 gage)
AlabamaCity,Ala. R2 .....4.75
Dover,O. R1 .....5.65
Ind.Harbor,Ind. I-2, ...5.40
Mansfield,O. E6 .....5.65
Niles,O. N12 .....5.75
Torrance,Calif. C11 .....5.40
SHEETS, H.R., (14-ga., heavier)
High-Strength Low-Alloy
Cleveland J5, R2 .....5.40
Conshohocken,Pa. A3 .....5.65
Ecorse,Mich. G5 .....5.95
Fairfield,Ala. T2 .....5.40
Fontana,Calif. K1 .....6.35
Gary,Ind. U5 .....5.40
Ind.Harbor,Ind. I-2 .....5.40
IndianaHarbor,Ind. Y1 ...5.90
Irvin,Pa. U5 .....5.40
Lackawanna(35) B2 .....5.40
Pittsburgh J5 .....5.40
Sharon,Pa. S3 .....5.40
So.Chicago,Ill. U5 .....5.40
SparrowsPoint (36) B2 .....5.40
Warren,O. R2 .....5.40
Weirton,W.Va. W6 .....5.75
Youngstown U5 .....5.40
Youngstown Y1 .....5.90
SHEETS, Cold-Rolled
High-Strength Low-Alloy
Cleveland J5, R2 .....6.55
Ecorse,Mich. G5 .....7.10
Fontana,Calif. K1 .....7.50
Gary,Ind. U5 .....6.55
IndianaHarbor,Ind. Y1 ...7.05
IndianaHarbor,Ind. I-2 ...6.55
Irvin,Pa. U5 .....6.55
Lackawanna(37) B2 .....6.55
Pittsburgh J5 .....6.55
SparrowsPoint(38) B2 .....6.55
Warren,O. R2 .....6.55
Weirton,W.Va. W6 .....6.90
Youngstown Y1 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10 ..... 4.35
Cleveland J5, R2 ..... 4.35
Ecorse,Mich. G5 ..... 4.55
Fairfield,Ala. T2 ..... 4.35
Follansbee,W.Va. F4 ... 5.35
Fontana,Calif. K1 ..... 5.30
Gary,Ind. U5 ..... 4.35
GraniteCity,Ill. G4 ..... 5.05
Ind.Harbor,Ind. I-2, Y1 4.35
Irvin,Pa. U5 ..... 4.35
Lackawanna,N.Y. B2 ..4.35
Middletown,O. A10 ....4.35
Pittsburg,Calif. C11 ....5.30
Pittsburgh J5 ..... 4.35
SparrowsPoint,Md. B2 ..4.35
Steubenville,O. W10 ....4.35
Warren,O. R2 ..... 4.35
Weirton,W.Va. W6 ....4.35
Youngstown Y1 ..... 4.35

SHEETS, Galv'd No. 10 Steel

AlabamaCity,Ala. R2 ..4.80
Ashland,Ky.(8) A10 ....4.80
Canton,O. R2 ..... 4.80
Dover,O. R1 ..... 5.50
Fairfield,Ala. T2 ..... 4.80
Gary,Ind. U5 ..... 4.80
GraniteCity,Ill. G4 ..... 5.50
Ind.Harbor,Ind. I-2 ....4.80
Irvin,Pa. U5 ..... 4.80
Kokomo,Ind.(13) C16 ..5.20
MartinsFerry,O. W10 ....4.80
Niles,O. N12 ..... 6.00
Pittsburg,Calif. C11 ....5.55
SparrowsPoint,Md. B2 ..4.80
Steubenville,O. W10 ....4.80
Torrance,Calif. C11 ....5.55
Weirton,W.Va. W6 ..... 4.80

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. U5 ..... 7.20
SparrowsPoint(39) B2 ..6.75

SHEETS, Galvannealed Steel

Canton,O. R2 ..... 5.35
Irvin,Pa. U5 ..... 5.35
Kokomo,Ind.(13) C16 ..5.75
Niles,O. N12 ..... 6.55

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10 ..... 5.05
Middletown,O. A10 ..... 5.05

SHEETS, Electro Galvanized

Cleveland R2 (28) 5.65
Niles,O. R2 (28) 5.65
Weirton,W.Va. W6 ..... 5.50

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2 ....5.70

SHEETS, Drum Body

Pittsburg,Calif. C11 ....4.30
Torrance,Calif. C11 ....4.30

SHEETS, Well Casing

Fontana,Calif. K1 ..... 5.10
Torrance,Calif. C11 ....5.10

BLUED Stock, 29 ga.

Yorkville,O. W10 ..... 6.80
Follansbee,W.Va.(23)F4 6.85

SHEETS, Enameling Iron

Ashland,Ky.(8) A10 ....4.65
Cleveland R2 ..... 4.65
Gary,Ind. U5 ..... 4.65
GraniteCity,Ill. G4 ....5.35
Ind.Harbor,Ind. I-2 ....4.65
Irvin,Pa. U5 ..... 4.65
Middletown,O. A10 ....4.65
Youngstown Y1 ..... 4.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5 ..... $6.25
Fairfield,Ala. T2 ..... 6.35
Gary,Ind. U5 ..... 6.25
GraniteCity,Ill. G4 ..... 6.45
Ind.Harbor,Ind. I-2, Y1 6.25
Irvin,Pa. U5 ..... 6.25
Niles,O. R2 ..... $6.25
Pittsburg,Cal. C11 ..... 7.00
SparrowsPoint,Md. B2 .. 6.35
Warren,O. R2 ..... 6.25
Weirton,W.Va. W6 ..... 6.25
Yorkville,O. W10 ..... 6.25

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4 ... 5.85
Gary,Ind. U5 ..... 5.85
GraniteCity,Ill. G4 ..... 6.05
Ind.Harbor,Ind. Y1 ....5.50
Irvin,Pa. U5 ..... 5.85
Yorkville,O. W10 ..... 6.15

SHEETS, Culvert No. 16 Pure Iron

Ashland,Ky. A10 ..... 5.60
Canton,O. R2 ..... 5.65
Fairfield,Ala. T2 ..... 5.60
Gary,U5 ..... 5.60
IndianaHarbor,I-2 ..... 5.60
Irvin,Pa. U5 ..... 5.60
Kokomo,Ind. C16 ..... 6.25
MartinsFry,O. W10 ..... 5.60
Pittsburg,Cal. C11 ..... 6.35
SparrowsPt. B2 ..... 5.60
Torrance,Cal. C11 ..... 6.35

SHEETS, Culvert, No. 16 Pure Iron

Ashland,Ky. A10 ..... 5.85
Fairfield,Ala. T2 ..... 5.85

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10 ....3.85
Cleveland R2 ..... 4.20
Ind.Harbor,Ind. I-2 ....3.85
Warren,O. R2 ..... 4.20

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 ..... 4.95
Middletown,O. A10 ..... 4.85
Warren,O. R2 ..... 4.95

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10 ....5.05
Canton,O. R2 ..... 5.55

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10 ..... 5.30
Middletown,O. A10 ..... 5.30

SHEETS, ALUMINIZED

Butler,Pa. A10 ..... 8.15

TINPLATE, American 1.25 Coke (Base Box)

	1.50 lb	1.75 lb
Aliquippa,Pa. J5	$8.45	$8.70
Fairfield,Ala. T2	8.55	8.80
Gary,Ind. U5	8.45	8.70
Ind.Har. I-2, Y1	8.45	8.70
Irvin,Pa. U5	8.45	8.70
Pitts.Cal. C11	9.20	9.45
Sp.Pt.,Md. B2	8.55	8.80
Warren,O. R2	8.45	8.70
Weirton,W.Va. W6	8.45	8.70
Yorkville,O. W10	8.45	8.70

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2 ..... $7.60
Gary,Ind. U5 ..... 7.50
Irvin,Pa. U5 ..... 7.50
SparrowsPoint,Md. B2 .. 7.60
Yorkville,O. W10 ..... 7.50

SHEETS, LT. Coated Ternes, 6 lb

Yorkville,O. W10 ....$8.40

SHEETS, Mfg. Ternes, 8 lb (Commercial Quality)

Gary,Ind. U5 ..... $9.50
Yorkville,O. W10 ..... 9.50

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va.W10 ..5.20
Gary,Ind. U5 ..... 5.20
Mansfield,O. E6 ..... 6.05
Middletown,O. A10 ....5.20
Niles,O. N12 ..... 6.00
Weirton,W.Va. W6 ..... 5.20

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....5.60

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5 ..... 9.50

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2 ..... 5.30
Conshohocken,Pa. A3 ..5.55
Ecorse,Mich. G5 ..... 5.95
Fairfield,Ala. T2 ..... 5.30
Fontana,Calif. K1 ..... 6.20
Gary,Ind. U5 ..... 5.30
Ind.Harb.,Ind. I-2 ....5.30
IndianaHarbor,Ind. Y1 ..5.80
Lackawanna,N.Y. B2 ..4.95
LosAngeles(25) B3 ..... 6.65
Seattle B3 ..... 6.30
Sharon,Pa. S3 ..... 5.40
So.SanFrancisco(25) B3 6.65
SparrowsPoint,Md. B2 ..4.95
Warren,O. R2 ..... 5.30
Weirton,W.Va. W6 ..... 5.75
Youngstown Y1 ..... 5.80
Youngstown U5 ..... 5.30

STRIP, Cold-Rolled, High-Strength Low-Alloy

Cleveland J5 ..... 6.70
Cleveland A7 ..... 6.55
Dover,O. G6 ..... 7.30
Fontana,Calif. K1 ..... 6.95
Lackawanna,N.Y. B2 ..6.40
Sharon,Pa. S3 ..... 6.55
SparrowsPoint,Md. B2 ..6.40
Warren,O. R2 ..... 6.55
Weirton,W.Va. W6 ..... 7.20
Youngstown Y1 ..... 7.05

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ....3.50
Alton,Ill. L1 ..... 3.95
Ashland,Ky.(8) A10 ....3.50
Atlanta A11 ..... 4.05
Bessemer,Ala. T2 ..... 3.50
Bridgeport,Conn.(10) S15 4.00
Buffalo(27) R2 ..... 3.50
Butler,Pa. A10 ..... 3.50
Carnegie,Pa. S18 ..... 4.00
Conshohocken,Pa. A3 ..3.90
Detroit M1 ..... 4.40
Ecorse,Mich. G5 ..... 3.80
Fairfield,Ala. T2 ..... 3.50
Fontana,Calif. K1 ..... 4.75
Gary,Ind. U5 ..... 3.50
Houston,Tex. S5 ..... 4.00
Ind.Harbor,Ind. I-2, Y1 3.50
Johnstown,Pa.(25) B2 ..3.50
KansasCity,Mo.(9) S5 ..4.10
Lackawanna,N.Y.(32)B2 3.50
LosAngeles B3 ..... 4.25
Milton,Pa. B6 ..... 4.00
Minneapa.,Colo. C10 .... 4.55
New Britain(10) S15 ..4.00
No.Tonawanda,N.Y. B11 3.50
Pittsburg,Calif. C11 ....4.25
Riverdale,Ill. A1 ..... 3.50
SanFrancisco S7 ..... 4.85
Seattle B3, N14 ..... 4.50
Sharon,Pa. S3 ..... 4.00
So.Chicago,Ill. W14 ....3.50
So.SanFrancisco B3 ....4.25
SparrowsPoint,Md. B2 ..3.50
Torrance,Calif. C11 ....4.25
Warren,O. R2 ..... 3.50
Weirton,W.Va. W6 ..... 3.60
WestLeechburg,Pa. A4 ..3.75
Youngstown U5, Y1 .... 3.50

STRIP, Hot-Rolled Alloy

Bridgeprt.Conn.(10) S15 5.45
Carnegie,Pa. S18 ..... 5.85
Fontana,Calif. K1 ..... 6.70
Gary,Ind. U5 ..... 5.50
Houston,Tex. S5 ..... 5.90
KansasCity,Mo. S5 ..... 6.10

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea,O. C7		6.80	7.40	9.35	11.65
Bridgeport,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
Bristol,Conn. W1			7.70	9.65	
Carnegie,Pa. S18		6.80	7.40	9.35	11.65
Cleveland A7	4.65	6.45	7.40	9.35	11.65
Dearborn,Mich. D3	5.60	7.05	7.65		
Detroit D2	5.60	6.65	7.25		
Dover,O. G6	5.50	6.80	7.40	9.35	11.65
Franklin Park,Ill. T6	5.60	6.60	7.55	9.50	11.80
Harrison,N.J. C18			7.70	9.65	11.95
Mattapan,Mass. T6	5.50	6.75	7.70	9.65	11.95
NewBrit.,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
NewCastle,Pa. B4	5.35	6.80	7.40	9.35	
NewCastle,Pa. E5	5.50	6.80	7.40	9.35	11.65
NewHaven,Conn. D2	5.85	6.75	7.35		
NewYork W3			7.10	7.70	9.65	11.95
Pawtucket,R.I. N8: Cleve.orPitts.Base			6.80	7.40	9.35	11.65
Worcester,Mass. Base	5.85		7.10	7.70	9.65	11.95
Sharon,Pa. S3	5.35		6.80	7.40	9.35	11.65
Trenton,N.J. R5			7.10	7.70	9.65	11.95
Wallingford,Conn. W2	5.85		6.75	7.35	9.30	11.60
Weirton,W.Va. W6	5.35		6.80	7.40	9.35	11.65
Worcester,Mass. A7	4.95		6.75	7.70	9.65	11.95
Worcester,Mass. T6	5.50		6.75	7.70	9.65	11.95
Youngstown C8			6.80	7.40	9.35	11.65

Spring Steel (Tempered)

Trenton,N.J. R5		10.30	12.50	15.35
Harrison,N.J. C18		10.30	12.50	15.35
NewYork W3		10.30	12.50	15.35

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6 ..5.50
Berea,O. C7 ..... 6.60
Bridgeport,Conn.(10) S15 5.35
Butler,Pa. A10 ..... 4.65
Cleveland A7, J5 ..... 4.65
Dearborn,Mich. D3 ....5.60
Detroit D2 ..... 5.60
Detroit M1 ..... 5.45
Dover,O.(40) G6 ..... 5.50
Ecorse,Mich. G5 ..... 4.85
Follansbee,W.Va. F4 ... 5.35
Fontana,Calif. K1 ..... 6.30
FranklinPark,Ill.(40)T6 4.90
Ind.Harbor,Ind. I-2 .... 4.90
Lackawanna,N.Y. B2 ..4.65
LosAngeles C1 ..... 6.40
Mattapan,Mass. T6 ....5.50
Middletown,O. A10 ....4.65
NewBritain(10) S15 ...5.35
NewCastle,Pa. B4 ..... 5.35
NewCastle(40) E5 ..... 5.25
NewHaven,Conn. D2 .... 5.85
NewHaven,Conn. A7 .... 5.15
Pawtucket,R.I. R3 .... 6.00
Pawtucket,R.I.(21) N8 ..5.85
Riverdale,Ill.(40) A1 ..4.90
Rome,N.Y. R6 ..... 5.10
Sharon,Pa. S3 ..... 5.35
SparrowsPoint,Md. B2 ..4.65
Trenton,N.J. R5 ..... 6.00
Wallingford,Conn. W2 ..5.85
Warren,O.(40) T3 ..... 5.25
Warren,O. R2 ..... 4.65
Weirton,W.Va. W6 ..... 4.65
Youngstown C8 (40) 5.25
Youngstown Y1 ..... 4.65

STRIP, Electro Galvanized

Dover,O. G6 ..... 5.50
Warren,O. T3 ..... 5.25
Weirton,W.Va. W6 ..... 4.65
Youngstown C8 ..... 5.25

TIN PLATE, Electrolytic (Base Box)

	0.25-lb	0.50 lb	0.75lb
Aliquippa,Pa. J5	$7.15	$7.40	$7.80
Fairfield,Ala. T2	7.25	7.50	7.90
Gary,Ind. U5	7.15	7.40	7.80
GraniteCity,Ill. G4	7.35	7.60	8.00
Ind.Harbor,Ind. I-2, Y1	7.15	7.40	7.80
Irvin,Pa. U5	7.15	7.40	7.80
Niles,O. R2	7.15	7.40	7.80
Pittsburg,Calif. C11	7.90	8.15	8.55
SparrowsPoint,Md. B2	7.25	7.50	7.90
Weirton,W.Va. W6	7.15	7.40	7.80
Yorkville,O. W10	7.15	7.40	7.80

SHEETS, SILICON, H.R. or C.R.(22 Ga.) COILS (Cut Lengths ½c lower)

	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W10 (cut-lengths)	...	...	7.25	8.50	9.30
Brackenridge,Pa. A4	...	...	7.75	9.00	9.80
GraniteCity,Ill.G4 (cut lengths)	...	...	7.95	9.20	...
Ind.Harbor,Ind. I-2	6.95	7.25	(34)	...	...
Mansfield,O. E6 (cut lengths)	7.10	7.25	7.75	9.00	9.80
Niles,O. N12 (cut lengths)	...	6.75	7.25	...	...
Vandergrift,Pa. U5	...	7.25	7.75	9.00	9.80
Warren,O. R2	6.95	7.25	7.75	9.00	9.80
Zanesville,O. A10	...	7.25	7.75	9.00	9.80

SHEETS, SILICON (22 Ga. Base) Coils (Cut Lengths ½c lower)

Transformer Grade	72	65	58	52
BeechBottom,W10 (cut lengths)	9.85	10.40	11.10	11.90
Brackenridge,Pa. A4	10.35	...	...	...
Vandergrift,Pa. U5	10.35	10.90	11.60	12.40
Warren,O. R2	10.35	...	...	...
Zanesville,O. A10	10.35	10.90	11.60	12.40

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)

	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)	...	...	14.75	15.25
Vandergrift,Pa. U5	12.90	13.75	14.75	15.25

Key To Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4—Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Tube
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Boardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B12 Buffalo Steel Co.
B14 A. M. Byers Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia Steel Co.
C12 Columbia Steel & Shaft
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Corp.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire

G1 Geneva Steel Co.
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

STRIP, Cold-Rolled Alloy Steel

Bridgeprt.Conn.(10)	$15 10.75
Carnegie,Pa.	S18 ....10.60
Cleveland	A7 ....10.00
Dover,O.	G6 ....10.50
Fontana,Calif.	K1 ....11.65
Harrison,N.J.	C18 ....10.60
Midland,Pa.	C18 ....10.60
NewBritn,Conn.(10)	$15 10.75
Pawtucket,R.I.(11)	N8..10.75
Pawtucket,R.I.(12)	N8..11.05
Sharon,Pa.	S3 ....10.60
Worcester,Mass.	A7 ..10.30
Youngstown	C5 ....10.60

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky. (8)	A10 ..3.75
Warren,O.	R2 ....4.10

STRIP, Cold-Rolled Ingot Iron

Warren,O.	R2 ....5.25

TIGHT COOPERAGE HOOP

Atlanta	A11 ....4.05
Riverdale,Ill.	A1 ....3.90
Sharon,Pa.	S3 ....4.15
Youngstown	U5 ....3.75

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
AlabamaCity	R2..5.70	5.95
Aliquippa	J5 ....5.70	6.15
Atlanta	A11 ....5.95	6.40
Bartonville(19)	K4 ....5.70	6.15
Buffalo	W12 ....4.85	....
Cleveland	A7 ....5.70	6.15
Crawfordsville	MS 5.95	6.40
Donora,Pa.	A7 ....5.70	6.15
Duluth,Minn.	A7 ....5.70	6.15
Fairfield	T2 ....5.70	6.15
Houston,Tex.	S5 ....6.10	6.55
Johnstown	B2 ....5.70	6.15
Joliet,Ill.	A7 ....5.70	6.15
KansasCy,Mo.	S5..6.30	6.75
Kokomo	C16 ....5.80	6.05
LosAngeles	B3 ....6.65	....
Minnequa	C10 ....5.95	6.45
Monessen	P7 ....5.95	6.40
Palmer	W12 ....5.15	....
Pitts.Calif.	C11 ..6.65	6.80
Pittsmth.(18)	P12 ..6.10	6.60
Rankin	A7 ....5.70	6.15
So Chicago	R2 ....5.70	5.95
So S.Fran.	C10 ..6.65	7.10
SparrowsPt.	B2 ....5.80	6.25
Sterling,Ill.(1)	N15 5.70	6.15
Struthers,O.	Y1 ....5.70	6.15
Torrance,Cal.	C11 6.65	....
Worcester	A7 ....6.00	6.45

ROPE WIRE

	(A)	(B)
Alton,Ill.	L1 ....8.65	8.90
Bartonville,Ill.	K4 8.55	8.80
Buffalo	W12 ....8.55	8.80
Fostoria,O.	S1 ....8.85	9.10
Johnstown,Pa.	B2 8.55	8.80
Monessen,Pa.	P16 8.55	8.80
Monessen,Pa.	P7 ....8.80	9.05
Palmer,Mass.	W12 8.85	9.10
Portsmouth,O.	P12 8.55	8.80
Roebling,N.J.	R5 ....8.85	9.10
SparrowsPt.	B2 ....8.65	8.90
Struthers,O.	Y1 ....8.55	8.80
Worcester	J4, T6. 8.85	9.10

(A) Plow and Mild Plow.
(B) Improved Plow.

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala.	R2...4.85
Aliquippa,Pa.	J5 ....4.85
Atlanta	A11 ....5.10
Alton,Ill.	L1 ....5.05
Bartonville,Ill.(1)	K4 ..4.85
Buffalo	W12 ....4.85
Chicago	W13 ....5.10
Cleveland	A7, C20 ....4.85
Crawfordsville,Ind.	MS 5.10
Donora,Pa.	A7 ....4.85
Duluth,Pa.	A7 ....4.85
Fairfield,Ala.	T2 ....4.85
Fostoria,O.(24)	S1 ....5.35
Houston	S5 ....5.25
Johnstown,Pa.	B2 ....4.85
Joliet,Ill.	A7 ....4.85
KansasCity,Mo.	S5 ....5.45
Kokomo,Ind.	C16 ....4.95
LosAngeles	B3 ....5.80
Minnequa,Colo.	C10 ....5.10
Monessen,Pa.	P7 ....5.10
Newark,	6-8 ga. I-1 ..5.50
No.Tonawanda	B11 ...4.85
Palmer,Mass.	W12 ....5.15
Pittsburg,Calif.	C11 ...5.80
Portsmouth,O.	P12 ....5.25
Rankin,Pa.	A7 ....4.85
So.Chicago,Ill.	R2 ....4.85
So.SanFrancisco	C10...5.80
SparrowsPoint,Md.	B2...4.95
Sterling,Ill.(1)	N15 ...4.85
Struthers,O.	Y1 ....4.85
Torrance,Calif.	C11 ...5.80
Waukegan,Ill.	A7 ....4.85
Worcester,Mass.	A7, T6.5.15

WIRE, Cold-Rolled Flat

Anderson,Ind.	G6 ....6.20
Buffalo	W12 ....6.35
Cleveland	A7 ....5.85
Crawfordsville,Ind.	MS..6.20
Detroit	D2 ....6.20
Dover,O.	G6 ....6.20
Fostoria,O.	S1 ....6.00
Kokomo,Ind.	C16 ....5.70
FranklinPark,Ill.	T6 ..6.20
Massillon,O.	R8 ....5.85
Monessen,Pa.	P16 ....5.85
Monessen,Pa.	P7 ....6.10
NewHaven,Conn.	D2 ....6.50
Pawtucket,R.I.(12)	NS..6.85
Trenton,N.J.	R5 ....6.15
Worcester	A7 ....6.15
Worcester	T6 ....6.50
Worcester	W12 ....6.65

WIRE, Galv'd ACSR for Cores

Bartonville,Ill.	K4 ....8.50
Monessen,Pa.	P16 ....8.50
Roebling,N.J.	R5 ....8.80
SparrowsPt,Md.	B2 ..8.60
Johnstown,Pa.	B2 ....8.50

WIRE, Tire Bead

Bartonville,Ill.(1)	K4..10.90
Monessen,Pa.	P16 ....11.40
Roebling,N.J.	R5 ....11.55

WIRE (16 gage)	An'ld Stone	Galv. Stone
Aliquippa	J5 ....10.15	12.15
Bartonville(1)	K4 ..10.25	11.95
Cleveland	A7 ....10.25	12.15
Crawfrdsville	MS..10.30	12.00
Fostoria,O.	S1 ....10.40	13.00
Johnstown,Pa.	B2 ....10.25	12.15
Kokomo	C16 ....10.25	11.95
Minnequa	C10 ....10.40	12.40
Palmer,Mass.	W12..10.25	12.15
Pitts.Cal.	C11 ....10.60	12.50
Prtsmth.(18)	P12..10.55	12.30
SparrowsPt.	B2 ....10.35	12.25
Waukegan	A7 ....10.25	12.15

WIRE, MB Spring, High Carbon

Aliquippa,Pa.	J5 ....6.25
Alton,Ill.	L1 ....6.45
Bartonville,Ill.(1)	K4 ..6.25
Buffalo	W12 ....6.25
Cleveland	A7 ....6.25
Donora,Pa.	A7 ....6.25
Duluth	A7 ....6.25
Fostoria,O.	S1 ....6.25
Johnstown,Pa.	B2 ....6.25
LosAngeles	B3 ....7.20
Milbury,Mass.(12)	N6 ..8.05
Monessen,Pa.	P7, P16 ..6.25
Palmer,Mass.	W12 ....6.55
Pittsburg,Calif.	C11 ....7.20
Roebling,N.J.	R5 ....6.55
Portsmouth,O.	P12 ....6.25
So.Chicago,Ill.	R2 ....6.25
So.SanFrancisco	C10 ..7.20
SparrowsPoint,Md.	B2 ..6.35
Struthers,O.	Y1 ....6.25
Trenton,N.J.	A7 ....6.55
Waukegan,Ill.	A7 ....6.25
Worcester,A7,	T6, W12 6.55
Worcester,Mass.	J4 ....6.75

WIRE, Fine & Weaving(8" Coils)

Bartonville,Ill.(1)	K4 ..8.90
Buffalo	W12 ....8.90
Chicago	W13 ....8.90
Cleveland	A7 ....8.90
Crawfordsville,Ind.	MS..8.95
Fostoria,O.	S1 ....8.90
Johnstown,Pa.	B2 ....8.90
Kokomo,Ind.	C16 ....8.90
Monessen,Pa.	P16 ....8.90
Palmer,Mass.	W12 ....9.20
Portsmouth,O.	P12 ....8.90
Roebling,N.J.	R5 ....9.20
Waukegan,Ill.	A7 ....8.90
Worcester,Mass.	A7 T6.9.20

WIRE, Barbed

	Col.
AlabamaCity,Ala.	R2 ...136
Aliquippa,Pa.	J5 140
Atlanta	A11 143
Bartonville,Ill.(19)	K4 143
Crawfordsville,Ind.	MS ..145
Donora,Pa.	A7 140
Duluth,Minn.	A7 140
Fairfield,Ala.	T2 140
Houston,Tex.	S5 148
Johnstown,Pa.	B2 140
Joliet,Ill.	A7 140
KansasCity,Mo.	S5 152
Kokomo,Ind.	C16 142
Minnequa,Colo.	C10 146
Monessen,Pa.	P7 145
Pittsburg,Calif.	C11 160
Portsmouth,O.(18)	P12..147
Rankin,Pa.	A7 140
So.Chicago,Ill.	R2 136
So.SanFran.,Calif.	C10 ..160
SparrowsPoint,Md.	B2 142
Sterling,Ill.(1)	N15 140

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala.	R2 123
Atlanta	A11 126
Bartonville,Ill.(19)	K4 123
Crawfordsville,Ind.	MS ..132
Donora,Pa.	A7 123
Duluth,Minn.	A7 123
Fairfield,Ala.	T2 123
Joliet,Ill.	A7 123
KansasCity,Mo.	S5 135
Kokomo,Ind.	C16 125
Minnequa,Colo.	C10 128
Pittsburg,Calif.	C11 147
So.Chicago,Ill.	R2 123
So.SanFran.,Calif.	C10 ..147
SparrowsPoint,Md.	B2 125
Sterling,Ill.(1)	N15 123

WIRE, Upholstery Spring

Aliquippa,Pa.	J5 ....5.90
Alton,Ill.	L1 ....6.10
Buffalo	W12 ....5.90
Cleveland	A7 ....5.90
Donora,Pa.	A7 ....5.90
Duluth,Minn.	A7 ....5.90
Johnstown,Pa.	B2 ....5.90
LosAngeles	B3 ....6.85
Monessen,Pa.	P7, P16 ..5.90
NewHaven,Conn.	A7 ....6.20
Palmer,Mass.	W12 ....6.20
Pittsburg,Calif.	C11 ....6.85
Portsmouth,O.	P12 ....5.90
Roebling,N.J.	R5 ....6.20
So.Chicago,Ill.	R2 ....5.90
So.SanFrancisco	C10 ..6.85
SparrowsPoint,Md.	B2 ..6.00
Torrance,Calif.	C11 ...6.85
Trenton,N.J.	A7 ....6.20
Waukegan,Ill.	A7 ....5.90
Worcester,Mass.	A7 ....6.20

WOVEN FENCE, 9-15½ Ga. Col.

AlabamaCity,Ala.	R2 ...126
Ala.City,Ala.	17-18ga.R2 213
Aliquippa,Pa.	9-14½ga.J5 130
Atlanta	A11 133
Bartonville,Ill.(19)	K4 130
Crawfordsville,Ind.	MS ..132
Donora,Pa.	A7 130
Duluth,Minn.	A7 130
Fairfield,Ala.	T2 130
Houston,Tex.	S5 138
Johnstown,Pa.	B2 130
Johnstown,17ga.,6"	B2 204
Johnstown,17ga.,4"	B2 207
Joliet,Ill.	A7 130
KansasCity,Mo.	S5 142
Kokomo,Ind.	C16 132
Minnequa,Colo.	C10 138
Monessen,Pa.	P7 135
Pittsburg,Calif.	C11 153
Portsmouth,O.(18)	P12 137
Rankin,Pa.	A7 130
So.Chicago,Ill.	R2 126
Sterling,Ill.(1)	N15 130

FENCE POSTS

ChicagoHts.,Ill.	C2 140
Duluth,Minn.	A7 125
Franklin,Pa.	F5 140
Huntington W.Va.	W7 140
Johnstown,Pa.	B2 140
Marion,O.	P11 140
Minnequa,Colo.	C10 130
Moline,Ill.	R2 136
So.Chicago	R2 140
Tonawanda,N.Y.	B12 ...140
Williamsport,Pa.	S19 130

TRACK BOLTS (20) Treated

KansasCity,Mo.	S5 ....9.85
Lebanon,Pa.,(32)	B2 ....9.85
Minnequa,Colo.	C10 ....9.85
Pittsburgh	O3, P14 ..9.85
Seattle	B3 ....10.35

RAILS

	Std. No. 1	Std. No. 2	Std. All No. 2	Tee Rails 60 lb Under
Bessemer,Pa.	U5	....	....	....
Ensley,Ala.	T2	....	....	....
Fairfield,Ala.	T2	....	....	....
Gary,Ind.	U5	....	....	....
Huntington W.Va.	W7	....	....	....
Ind. Harbor,Ind.	I-2	....	....	....
Johnstown,Pa.	B2	....	....	....
Lackawanna	B2	....	....	....
Minnequa,Colo.	C10	....	....	....
Steelton,Pa.	B2	....	....	....
Williamsport,Pa.	S19	....	....	....

NAILS & STAPLES, Stock

To dealers & mfrs. (7)	Col.
AlabamaCity,Ala.	R2 118
Aliquippa,Pa.(13)	J5 118
Atlanta	A11 121
Bartonville,Ill.(19)	K4 118
Chicago,Ill.	W13 118
Cleveland	A9 125
Crawfordsville,Ind.	MS ..122
Donora,Pa.	A7 118
Duluth,Minn.	A7 118
Fairfield,Ala.	T2 118
Galveston,Tex.	D7 126
Houston,Tex.	S5 126
Johnstown,Pa.	B2 118
Joliet,Ill.	A7 118
KansasCity,Mo.	S5 130
Kokomo,Ind.	C16 120
Minnequa,Colo.	C10 123
Monessen,Pa.	P7 124
Pittsburg,Calif.	C11 137
Portsmouth,O.	P12 124
Rankin,Pa.	A7 118
So.Chicago,Ill.	R2 118
SparrowsPoint,Md.	B2 ..120
Sterling,Ill.(1)	N15 118
Torrance,Calif.	C11 138
Worcester,Mass.	A7 124

NAILS, Cut (100 lb keg)

To dealers (33)	
Conshohocken,Pa.	A3 .$7.35
Wheeling,W.Va.	W10 ...7.35

TIE PLATES

Fairfield,Ala.	T2 ....4.50
Gary,Ind.	U5 ....4.50
Ind.Harbor,Ind.	I-2 ....4.50
Lackawanna,N.Y.	B2 ....4.50
Minnequa,Colo.	C10 ....4.50
Pittsburg,Calif.	C11 ....4.65
Seattle	B3 ....4.65
Steelton,Pa.	B2 ....4.50
Torrance,Calif.	C11 ....4.65

JOINT BARS

Bessemer,Pa.	U5 ....4.70
Fairfield,Ala.	T2 ....4.70
Ind.Harbor,Ind.	I-2 ....4.70
Joliet,Ill.	U5 ....4.70
Lackawanna,N.Y.	B2 ....4.70
Minnequa,Colo.	C10 ....4.70
Steelton,Pa.	B2 ....4.70

STANDARD TRACK SPIKES

Ind.Harbor,Ind.	I-2, Y1..6.15
KansasCity,Mo.	S5 ....6.40
Lebanon,Pa.	B2 ....6.15
Minnequa,Colo.	C10 ....6.15
Pittsburgh	J5 ....6.15
Seattle	B3 ....6.65
So.Chicago,Ill.	R2 ....6.15
Struthers,O.	Y1 ....6.15
Youngstown	R2 ....6.15

AXLES

Ind.Harbor,Ind.	S18 ....5.60
Johnstown,Pa.	B2 ....5.60

Key to Producers

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.

N2 National Supply Co.
N3 National Tube Co.
N5 Nelsen Steel & Wire Co.
N6 NewEng-HighCarb. Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Co.
N14 Nrthwst.Steel Roll Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,Eaton Mfg.
S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
T2 Tenn. Coal, Iron & R.R.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
U1 Ulster Iron Works
U4 Universal Cyclops Steel
U5 United States Steel Co.
V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.
W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West Auto Mach. Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div. International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
Y1 YoungstownSheet&Tube

TOOL STEEL

—Grade by Analysis—

Grade	$ per lb	W	Cr	V	Co	Mo	$ per lb
Reg. Carbon	0.230	20	4	1	12	2	3.535-3.675
Exera Carbon	0.270	18	4	2	7	..	2.460
Spec. Carbon	0.325	18	4	2	4	1	2.125
Oil Hardening	0.350	18	4	2	9	..	2.445-2.450
5% CrHotWrk.	0.350	13.5	4	3	..	..	1.60¼
Hi-Carbon-Cr.	0.635	6.4	4.5	1.9	..	5	0.96-0.965
18W.4Cr.1V	1.505	6	4	1	..	6	1.190
18W.4Cr.2V	1.650	1.5	4	1	..	8.5	0.810

Tool steel producers include: A4, A8, B2, B8, C4, C8, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2, V3.

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant. (4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Buffalo base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pittsburgh bases.
(12) Worcester, Mass. base.
(13) Add 0.50c for 17 Ga. & heavier.
(14) Also wide flange beams.
(15) ½" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pittsburgh base.
(20) Deduct 0.25c for untreated.
(21) New Haven, Conn. base.
(22) Del. San Fran. Bay. area.
(23) 28 Ga. 36" wide.
(24) Deduct 0.20c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing, mill lengths, to fabricators; to consumers, 10c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Subject to 10% increase.
(30) Sheared; add 0.25c for universal mill.
(31) Not annealed.
(32) Rd. edge of square edge.
(33) To jobbers, deduct 20 cents.
(34) 7.25c for cut lengths.
(35) 72" and narrower.
(36) 56" and narrower.
(37) 15 gage & lighter: 60" & narrower.
(38) 14 gage & lighter: 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035": 0.035" and heavier, 0.25c higher.

. . . YET SCRAP INVENTORIES ARE ALARMINGLY LOW. *YOU* ARE BEING COUNTED ON TO HELP KEEP THE FURNACES WORKING . . . TO AID DEFENSE

With our increased steel production, the furnaces are gobbling up an enormous amount of iron and steel scrap.

More—far more—scrap than is at present going into their scrap stockpiles.

Many mills are operating on a hand-to-mouth basis. Some are already threatened with shutdown—for lack of scrap.

The Danger Is Increasing

Will efforts to fill the tremendous demands for steel fail because of lack of scrap?

Steel is made from 50% scrap. We could be severely handicapped—in our aim to keep abreast of both military and civilian requirements—if scrap suppliers can't keep pace with productive capacity.

But they *can* keep pace . . . with your help!

Enough Scrap IS Available!

Yes—the only problem is to get the available extra scrap from where it is—to where it's needed.

Where is it?

In *your* business . . . in the form of old machines and equipment, tools, implements, dies, jigs, fixtures, outmoded structures, chains, valves, wheels, pulleys—any old iron and steel that's rusting away.

Six Million EXTRA Tons Needed!

By the end of 1952, we'll be producing steel at an annual rate of 20 million tons more than in 1950. That means we will need at least 6 million more tons of scrap than we've ever needed before.

It's up to you. Write at once to Advertising Council, 25 W 45 St., New York 19, N. Y., for a free copy of "Top Management: Your Program For Emergency Scrap Recovery".

Please write today—there's not a day to lose.

NON-FERROUS SCRAP IS NEEDED, TOO!

This advertisement is a contribution, in the national interest, by

STEEL

The Weekly Magazine of Metalworking

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Black A	Black B	Black C	Galvanized D	Galvanized E	Galvanized F
⅛	5.5c	0.24	34.0	32.0	29.0	1.5	+0.5	+3.5
¼	6.0	0.42	28.5	26.5	23.5	+1.0	+3.0	+6.0
⅜	6.0	0.57	23.5	21.5	18.5	+7.0	+9.0	+12.0
½	8.5	0.85	36.0	34.0	35.0	14.0	12.0	13.0
¾	11.5	1.18	39.0	37.0	38.0	18.0	16.0	17.0
1	17.0	1.68	41.5	39.5	40.5	21.5	19.5	20.5
1¼	23.0	2.28	42.0	44.0	41.0	22.0	24.0	21.0
1½	27.5	2.78	42.5	41.5	41.5	23.0	21.5	22.0
2	37	3.68	43.0	41.0	42.0	23.5	21.5	22.5
2½	58.5	5.82	43.5	41.5	42.5	24.0	22.0	23.0
3	76.5	7.62	43.5	41.5	42.5	24.0	22.0	23.0

Column A: Etna, Pa. N2; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va., 3½ points lower on ⅛", 1½ points lower on ¼", and 2 points lower on ⅜", W10; Sharon, Pa. M6, 1 point higher on ⅛", 2 points lower on ¼" and ⅜". Following make ½" and larger: Lorain, O., N3; Youngstown F2 and 36¼ % on 3½" and 4"; Youngstown Y1; Aliquippa, Pa. J5; Fontana, Calif. K1 quotes 11½ points lower on ½" and larger continuous weld and 24% on 3½" and 4". Columns B & E: Sparrows Point, Md. B2.

Columns C & F: Indiana Harbor, Ind., ½" through 3", Y1; Alton, Ill., 2 points lower discount L1.

Column D: Butler, Pa. F6, ⅛-⅜"; Benwood, W. Va. W10, except plus 3½ % on ⅛", plus 2½ % on ¼", plus 9% on ⅜"; Sharon, Pa. M6, plus 0.5 on ⅛", 1 point lower on ½", ¾", 1½ points lower on 1" and 1¼", 2 points lower on 1½", 2", 2½" and 3". Following quote only on ½" and larger: Lorain, O. N3; Youngstown R2, and 16½ % on 3½" and 4"; Youngstown Y1. Aliquippa, Pa. J5 quotes 1 point lower on ⅜", 2 points lower on 1", 1½ points lower on 1¼", 2 points lower on 1½" and 2", 1½ points lower on 2½" and 3"; Etna, Pa. N2 and 18½ % on 3½" and 4".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.68	29.5	9.5	29.5	9.5
2½	58.5	5.82	32.5	12.5	32.5	12.5
3	76.5	7.62	32.5	12.5	32.5	12.5
3½	82.0	9.20	34.5	14.5	34.5	14.5
4	$1.09	10.89	34.5	14.5	34.5	14.5
5	1.48	14.81	37.0	17.0	37.0	17.0
6	1.92	19.18	37.0	17.0	37.0	17.0

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5 quotes 1½ pts lower on 2", 1 pt lower on 2½-6 in.; Lorain N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft. mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	13.45	16.47	15.36	15.36
1¼	13	16.09	19.71	15.61	18.19
1½	13	17.27	21.15	17.25	20.39
1¾	13	19.29	23.62	19.62	23.09
2	13	21.62	26.48	21.99	25.86
2¼	13	24.35	29.82	24.50	28.84
2¼	12	26.92	32.97	26.98	31.76
2½	12	29.65	36.32	29.57	34.76
2¾	12	32.11	39.33	31.33	36.84
3	12	34.00	41.64	32.89	38.70

CLAD STEELS

(Cents per pound)

Cladding Stainless	Plates 10%	Plates 20%	Strip Cold-Rolled Carbon Base 10%	Strip Cold-Rolled Carbon Base Both Sides	Sheets Carbon Base 10%	Sheets Carbon Base 20%	Sheets Cu Base Both Sides
302	....	....	....	....	19.75	26.24–27.50	77.00
304	25.00	29.50	....	....	24.50	27.50–27.77	77.00
309	30.50	35.00	....	....	....	....	....
310	36.50	41.00	....	....	....	....	144.00
316	29.50	34.00	....	....	26.00	35.92–36.50	....
317	34.50	39.00	....	....	....	....	....
318	33.50	38.00	....	....	....	....	....
321	26.50	31.00–32.00	....	....	23.00	33.00	111.00
347	27.50	32.00	....	....	24.00	33.50–33.83	130.00
405	21.25	27.75	....	....	....	....	....
410	20.75	27.25	....	....	....	....	....
Nickel	33.55	45.15	41.00	54.00	....	....	....
Inconel	41.23	54.18	....	....	....	....	165.00
Monel	34.93	46.28	....	....	....	....	....
Copper*	....	....	23.70†	29.65‡	....	....	....

* Deoxidized. † 20.20c for hot-rolled. ‡ 26.40c for hot-rolled. Production points for carbon base products: Stainless plates, sheet, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; nickel, copper-clad strip, Carnegie, Pa., S18. Production point for copper-base sheets is Carnegie, Pa. A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:	
½-in. & smaller diam.	15
⅝-in. & ¾-in.	18.5
⅞-in. and larger	17.5
Longer than 6 in.:	
All diams.	14
Lag bolts, all diams.:	
6 in. and shorter	23
over 6 in. long	21
Ribbed Necked Carriage	18.5
Blank	34
Plow	34
Step, Elevator, Tap, and Sleigh Shoe	21
Tire bolts	12
Boiler & Fitting-Up bolts	31

NUTS

H.P. & C.P. Square:	Reg.	Hvy.
½-in. & smaller	15	15
⅝-in. & ¾-in.	12	6.5
⅞-in.-1¼-in.	9	1
1⅜-in. & larger	7.5	1
H.P. Hex.:		
½-in. & smaller	26	22
⅝-in. & ¾-in.	16.5	6.5
⅞-in.-1¼-in.	12	2
1⅜-in. & larger	8.5	2
C.P. Hex.:		
½-in. & smaller	26	22
⅝-in. & ¾-in.	23	17.5
⅞-in. to 1½-in.	19.5	12
1⅜-in. & larger	12	6.5

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or keg quantities)

	Reg.	Hvy.
½-in. & smaller	35	28.5
⅝-in. & ¾-in.	29.5	22
⅞-in.-1¼-in.	24	15
1⅜-in. & larger	13	8.5
		Light
⅞-in. & smaller		35
1-in. to 1½-in.		28.5
1¾-in. to 1½-in.		26

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish	48 & 10
Plated finishes	31 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:	
⅝-in. & smaller	42
¾-in. through 1 in.	34
Longer than 6 in.:	
⅝-in. & smaller	26
¾-in. through 1-in.	4

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter	38
1 in. and smaller diam. x over 6 in.	26

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	35
¼-in. diam. & larger	16
N.F. thread, all diams.	10

RIVETS

F.o.b. midwestern plants

Structural ½-in., larger 7.85c

⅞-in. under ..... 36 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers . .List to list-plus-$1.

FLUORSPAR

Metallurgical grade, f. o. b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70%, $43; 60%, $40.

Imported, net ton, duty paid, metallurgical grade, $33-$35.

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Inches Diam.	Inches Length	Cents per lb
17,18,20	60,72	17.85
8 to 16	48,60,72	17.85
7	48,60	19.57
6	48,60	20.95
CARBON		
35,40	110	8.03
30	65,84,110	8.03
24	72 to 104	8.03
17 to 20	34,90	8.03

STAINLESS STEEL

Type	C.R. Sheets	C.R. Strip	Structurals Wire	Structurals
301	41.00	34.00	31.25	
302	41.25	36.75	31.50	
303	43.25	40.25	34.00	
304	43.25	38.75	33.00	
309	56.00	55.00	44.75	
316	57.00	59.00	49.25	
321	49.25	48.25	37.00	
347	53.75	52.25	41.50	
410	36.50	30.50	25.75	
416	37.00	37.00	26.25	
420	44.00	47.00	31.25	
430	39.00	31.00	24.25	
501	27.50	26.00	14.25	
502	28.50	27.00	15.25	

Bait., Types 301-347 sheet, quotes slight variations on Types 301-347.

Bridgeville, Pa., bars, wire, except 303 and 309 E2.

Brackenridge, Pa., sheets A4 sheets & strip U4.

Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502, A10.

Carnegie, Pa., sheets and strip except Type 303, 416, 501 & 502 and 0.25c lower on Types 302, 304, 321, 347; 0.50c lower on Types 309 and 316 S18.

Cleveland, strip A7.

Detroit, strip M1 quotes 34.00c on Type 301; 36.50c, 302; 38.50c, 304; 58.50c, 316; 52.00c, 347; 30.50c, 410; 31.00c, 430.

Dunkirk, N. Y., bars, wire A4 quotes slight variations on Types 301-347.

Duquesne, Pa., bars U5.

Fort Wayne, Ind., bars and wire, except Types 501 & 502 J6 quotes slight variations on Types 301-347.

Gary, Ind., sheets except Type 416 U5.

Harrison, N. J., strip and wire C18.

Massillon, O., all items, R2.

McKeesport, Pa., strip, Type 410; bars & wire, Types 410 through 430 and 31.25c on Type 302, 33.75c on 303, 32.75c on 304, 48.75c on 316, 36.25c on 321, 41.25c on 347 F2.

McKeesport, Pa., bars, sheets except Type 416 U5.

Middletown, O., sheets and strip except Types 303, 416, 420, 501 and 502 A10.

Midland, sheets & strip C18.

Munhall, Pa., bars U5.

Pittsburgh, sheets C18.

Reading, Pa., strip except 34.25c on Type 301 and 56.00c on 309; bars, except 31.50c on Type 301 and 43.25c on 309 T4.

Sharon, Pa., strip, except Types 303, 309, 416, 501, 502 and 34.25c on Type 301 S3.

So. Chicago, Ill., bars & structurals U5.

Syracuse, N. Y., bars, wire & structurals C18.

Titusville, Pa., bars, U4.

Wallingford, Conn., strip, W2 quotes 0.25c higher.

Washington, Pa., bars, sheets & strip, except 0.25c higher on Type 301 J3.

Washington, Pa., Types 301 through 347 sheets & strip except 303, 309; 316 sheets 62.00c, strip 64.00c W4.

Watervliet, N. Y., structurals & bars A4 quotes slight variations on Types 301-347.

Waukegan, bars & wire A7.

West Leechburg, Pa., strip, A4 quotes slight variations on Types 301-347.

Youngstown, strip, except Types 303, 309, 316, 416, 501 and 502 and 34.25c on Type 301.

COAL CHEMICALS

Spot, cents per gallon, ovens

Pure benzol 30.00-35.00

Toluol, one deg...26.00-33.00

Industrial xylol .25.00-33.50

Per ton bulk, ovens

Sulphate of ammonia $32 $45

Cents per pound, ovens

Phenol, 40 (carlots, non-returnable drums) . .17.25

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

Sponge iron	Cents
98 + % Fe, carlots	17.00
Swedish, c.l.f. New York, in bags	8.85-9.95
Electrolytic Iron:	
Annealed, 99.5% Fe.	42.50
Unannealed, 99 + % Fe	36.50
Unannealed, 99 + % Fe (minus 325 mesh)	58.50
Powder Flakes	45.50
Carbonyl Iron:	
97.9-99.5%, size 5 to 10 microns	.83.00-148.00
Aluminum:	
Carlots, freight allowed	29.50
Atomized, 500 lb drums, freight allowed	33.50
Antimony	75.85
Brass, 10-ton lots	30.00-33.25
Bronze, 10-ton lots	31.25-40.00
Phosphor-Copper, 10 ton lots	50.00
Copper:	
Electrolytic	37.25-46.25
Reduced	33.75-37.00
Lead	25.50
Magnesium	75.00-85.00
Manganese:	
Minus 100-mesh	57.00
Minus 35 mesh	52.00
Minus 200 mesh	62.00
Nickel unannealed	86.00
Nickel-Silver, 10-ton lots	45.00
Silicon	38.50
Solder (plus cost of metal)	8.50
Stainless Steel, 302	83.00
Zinc, 10-ton lots	23.00-30.50

Tungsten	Dollars
Melting grade, 99%, 60 to 200 mesh, freight allowed:	
1000 lb and over	6.00
Less than 1000 lb	6.15
98.8% minus 65 mesh, freight allowed:	
1000 lb and over	4.15
Less than 1000 lb	4.25

Molybdenum:

99.9%, minus 200 mesh 3.25

Chromium, electrolytic

99% Cr min. 3.50

METALLURGICAL COKE

Price per net ton

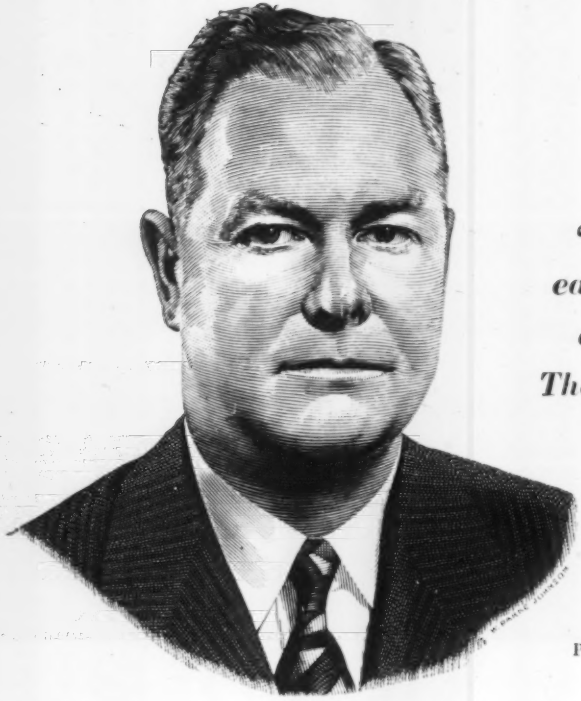
BEEHIVE OVENS

Connellsvil.fur.	$14.50-15.00
Connellsvil.fdry.	17.00-18.00
New River foundry	21.30
Wise county, foundry	15.95
Wise county, furnace	15.30

OVEN FOUNDRY COKE

Kearny, N. J., ovens	$22.75
Everett, Mass., ovens	
New England, del.	*24.80
Chicago ovens	23.00
Chicago, del.	24.50
Terre Haute, ovens	22.50
Milwaukee, ovens	23.75
Indianapolis, ovens	22.75
Chicago, del.	26.43
Cincinnati, del.	25.85
Detroit, del.	26.85
Ironton, O., ovens	22.50
Cincinnati, del.	25.13
Painesville, O., ovens	24.00
Cleveland, del.	25.82
Erie, Pa., ovens	23.50
Birmingham, ovens	20.30
Birmingham, del.	21.60
Philadelphia, ovens	22.70
Nevillelsland Pa.,ovens	23.00
Swedeland, Pa., ovens	22.60
St. Louis, ovens	
St. Louis, del.	25.40
Portsmouth, O., oven	22.50
Cincinnati, del.	25.12
Detroit, ovens	24.00
Detroit, del.	25.00
Buffalo, del.	26.89
Flint, del.	26.59
Pontiac, del.	25.47
Saginaw, del.	26.92

* Or within $4.15 freight zone from works.



"... Nearly nine out of each ten of our employees are ... participating in The Payroll Savings Plan."

E. J. HANLEY

President, Allegheny Ludlum Steel Corporation

"Systematic Savings offer the surest means of future security and we know of no better systematic savings plan than that afforded by payroll deduction purchases of U. S. Defense Bonds. Nearly nine out of each ten of our employees are helping their country while they save by participating in this plan."

There are three easily understood reasons why 88% of Allegheny Ludlum's 14,378 employees are enrolled in the Payroll Savings Plan:

- the recognition by Mr. Hanley and his associates of the Payroll Savings Plan as a major contribution to America's Defense effort . . . an important, stabilizing factor in our national economy . . . a road to personal security for Allegheny Ludlum employees.

- Allegheny Ludlum's person-to-person canvass of employees, which put an application blank for the Payroll Savings Plan in the hands of every man and woman on the company payroll.

- the patriotism and sound sense of the Allegheny Ludlum employees who know that every dollar they invest *each month* in U. S. Defense Bonds is a double duty dollar—it helps to keep America strong . . . it builds personal security for the employee.

If employee participation in *your* Payroll Savings Plan is less than 50% . . . or if you are one of the relatively few industrial companies that does not have a Payroll Savings Plan, phone, wire or write *today* to Savings Bond Division, U. S. Treasury Department, Suite 700, Washington Building, Washington, D.C. You will get all the assistance you may need to place your company among the thousands of companies that have 60, 70, 80%, even 88% participation in the Plan That Protects.

The U. S. Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

STEEL

The Weekly Magazine of Metalworking

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140‡		Carbon	Floor
New York (city)	6.27	7.29	8.44	6.59	...	6.42	7.29	9.25	6.40	6.58	8.04
New York(c'try)	5.97	6.99	8.14	6.29	...	6.12	6.99	8.95	6.10	6.28	7.74
Boston (city)	6.40	7.20	8.49	6.35	...	6.25	7.04	9.25	6.40	6.98	7.88
Boston (c'try)	6.20	7.00	8.29	6.15	...	6.05	6.84	9.05	6.20	6.78	7.68
Phila. (city)	6.15	7.05	8.25	6.35	...	6.30	7.11	8.90	6.15	6.30	7.40
Phila. (c'try)	5.90	6.80	8.00	6.10	...	6.05	6.86	8.65	5.90	6.05	7.15
Balt. (city)	5.80	7.04	8.27	6.24	...	6.24	7.09	...	6.34	6.00	7.64
Balt. (c'try)	5.60	6.84	8.07	6.04	...	6.04	6.89	...	6.14	5.80	7.44
Norfolk, Va.	6.50	...	...	6.70	...	6.55	7.70	...	6.60	6.50	8.00
Richmond, Va.	5.90	...	8.10	6.10	...	6.10	6.90	...	6.30	6.05	7.80
Wash. (w'hse)	6.02	7.26	8.49	6.46	...	6.46	7.26	...	6.56	6.22	7.88
Buffalo (del.)	5.80	6.60	8.29	6.06	...	5.80	6.65	10.65††‡	6.00	6.25	7.55
Buffalo (w'hse)	5.60	6.40	8.09	5.86	...	5.60	6.45	10.45††‡	5.80	6.05	7.35
Pitts. (w'hse)	5.60	6.40*	7.75	5.65-5.95	6.90	5.55	6.40	10.10††	5.70	5.75	7.00
Detroit (w'hse)	5.45-5.78	6.53-6.80	7.99	5.94-5.95	7.75	5.84	6.56	8.91	6.09	6.19-6.35	7.28
Cleveland (del.)	5.80	6.60	8.30	5.89	7.10	5.77	6.60-6.70	8.91	10.02	6.12	7.82
Cleve. (w'hse)	5.60	6.40	8.10	5.69	6.90	5.57	6.40-6.50	8.71	5.82	5.92	7.12
Cincin. (city)	6.02	6.59	7.34	5.95	...	5.95	6.51	...	6.24	6.34	7.50
Chicago (city)	5.80	6.60	7.95	5.75	...	5.75	6.50	10.30	5.90	6.00	7.20
Chicago (w'hse)	5.60	6.40	7.75	5.55	...	5.55	6.30	10.10	5.70	5.80	7.00
Milwaukee (city)	5.94	6.74	8.09	5.89	...	5.89	6.74	10.44	6.04	6.14	7.34
Milwau. (c'try)	5.74	6.54	7.89	5.69	...	5.69	6.54	10.24	5.84	5.94	7.14
St. Louis (del.)	6.05	6.85	8.20	6.00	...	6.00	6.85	10.55	6.23	6.33	7.53
St. L. (w'hse)	5.85	6.65	8.00	5.80	...	5.80	6.65	10.35	6.03	6.13	7.33
Kans. City(city)	6.40	7.20	8.40	6.35	...	6.35	7.20	...	6.50	6.60	7.80
KansCity(w'hse)	6.20	7.00	8.20	6.15	...	6.15	7.00	...	6.30	6.40	7.60
Birm'hm (city)	5.75	6.55	6.90‡	5.70	...	5.70	7.53	...	5.85	6.10	8.25
Birm'hm(w'hse)	5.60	6.40	6.75‡	5.55	...	5.55	7.53	...	5.70	5.95	8.23
Los Ang. (city)	6.55	8.10	9.05‡	6.60	8.90	6.55	7.75	...	6.55	6.60	9.20
L. A. (w'hse)	6.35	7.90	8.85‡	6.40	8.70	6.35	7.55	...	6.35	6.40	8.70
San Francisco	6.65	7.80‡	8.90‡	6.60	...	6.45	8.20	...	6.45	6.50	8.60
Seattle-Tacoma	7.05	8.60‡	9.20‡	7.30	...	6.75	9.10	11.15	6.65	6.75	8.80

Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; ‡—500 to 1499 lb; *—450 to 1499 lb; †—3500 lb and over; §—1000 to 1999 lb.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural), lower lake ports.

After adjustment for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in applicable lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

Old range bessemer	$8.70
Old range nonbessemer	8.55
Mesabi bessemer	8.45
Mesabi nonbessemer	8.30
High phosphorus	8.30

Eastern Local Ore

Cents per unit, del. E. Pa.

Foundry and basic 56-62% concentrates contract	17.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	17.00
Long-term contract	15.00
North African hematites	17.00
Brazilian iron ore, 68-69%	24.00-25.00

Tungsten Ore

Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit	$65.00
Domestic scheelite, mines	65.00

Manganese Ore

Manganese, 48% nearby, $1.18-$1.22 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 79.8-$1.5c.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$32.50
48% 3:1	35.00-36.00
48% no ratio	26.00

South African Transvaal

44% no ratio	$27.00-28.00
48% no ratio	34.00-35.00

Brazilian

44% 2.5:1 lump	$32.00

Rhodesian

45% no ratio	$20.00-21.00
48% no ratio	26.00
48% 3:1 lump	35.00-36.00
48% 3:1 Domestic—rail nearest seller	$39.00

Molybdenum

Sulphide concentrates per lb. molybdenum content, mines	$1.00

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton, $75, Palmerton, Pa.; $75, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $185 per gross ton of alloy, c.l. packed, $197; gross ton lots, packed, $212; less gross ton lots, packed, $229; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Ashtabula, O. Base price: $187, Johnstown, Pa.; $185, Sheridan, Pa.; $188, Etna, Pa.; $190, Chattanooga, Tenn; $186, Anaconda, Mont.

Shipment from Pacific Coast warehouses by one seller, add $33 to above prices f.o.b. Los Angeles, Oakland, Portland, Oreg. Shipment from Chicago warehouse, ton lots $227; less gross ton lots, $244 f.o.b. Chicago. Add or subtract $2.30 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 25.75c per lb of contained Mn, carload packed 26.5c, ton lots 27.6c, less ton 28.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 75% C—max. 7% Si. **Special Grade:** (Mn 90% min., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max.). Carload, lump, bulk 19.15c per lb of contained Mn, carload packed 19.9c, ton lot 21.0c, less ton 22.2c. Delivered. Spot, add 0.25c.

Manganese metal, 2" x D (Mn 96% min., Fe 2% max., Si 1% max., C 0.2% max.): Carload, lump, bulk, 34c per lb of metal; packed, 34.75c; ton lot 36.25c; less ton lot 38.25c. Delivered. Spot, add 2c.

Manganese Electrolytic: 40,000 lb or more, 28c; 2000 to 39,999 lb, 30c; 250 to 1999 lb, 32c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si 9.90c per lb of alloy, carload packed, 10.65c, ton lot 11.55c, less ton 12.55c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lot 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.). Ton lot $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%.) Contract, $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max., C 0.4% max.). Contract, ton lot, 2" x D, $4.90 per lb of contained Cb, less ton $4.95. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min., C 0.30 max.) ton lots, 2" x D, $3.75 per lb of contained Cb plus Ta, deld.; less ton lots $3.80.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr, 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed, 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ¼" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 18c per lb of alloy; ton lots 19c; less ton lots 20.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-S Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 15c per lb of alloy; ton lots 16.50c; less ton lots 17.75c, f.o.b., Niagara Falls; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 14.50c, packed 15.50c; ton lots, packed, 15.75c; less ton lots, packed, 16.25c per lb of alloy, delivered to destination within United States.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, or Siglo, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb. contained Mo, f.o.b. Langeloth, $1.32; Washington, Pa., furnace, any quantity $1.32.

Technical Molybdic-Oxide: Per lb. contained Mo, f.o.b. Langeloth $1.14, packed in bags containing 20 lb of molybdenum; Washington, Pa., $1.13.

NOTE: Current prices on chromium, silicon, vanadium, boron and tungsten alloys appeared on page 135, Oct. 22 issue; calcium, zirconium and briquetted alloys, page 111, Oct. 29. Refractories prices also were published on page 111, Oct. 29 issue.

CEILING PRICES, IRON AND STEEL SCRAP

Prices as set forth in Office of Price Stabilization ceiling price regulation No. 5, as amended Oct. 23, 1951

STEELMAKING SCRAP COMPOSITE

Nov. 1	$43.00
Oct. 25	43.00
Sept. 1951	44.00
Oct. 1950	41.37
Oct. 1946	19.17

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

Basing point ceiling prices per gross ton from which maximum shipping prices are computed on scrap of dealer and industrial origin; and from which ceiling on-line and ceiling delivered prices are computed on scrap of railroad origin.

Basing Point	Grade 1 No. 1 Bundles Dealer, Industrial	No. 1 Heavy Melt Railroad
Alabama City, Ala.	$39.00	$41.00
Ashland, Ky.	42.00	44.00
Atlanta, Ga.	39.00	41.00
Bethlehem, Pa.	42.00	44.00
Birmingham, Ala.	39.00	41.00
Brackenridge, Pa.	44.00	46.00
Buffalo, N. Y.	43.00	45.00
Butler, Pa.	44.00	46.00
Canton, O.	44.00	46.00
Chicago, Ill.	42.50	44.50
Cincinnati, O.	43.00	45.00
Claymont, Del.	42.50	44.50
Cleveland, O.	43.00	45.00
Coatesville, Pa.	42.50	44.50
Conshohocken, Pa.	42.50	44.50
Detroit, Mich.	41.15	43.15
Duluth, Minn.	40.00	42.00
Harrisburg, Pa.	42.50	44.50
Houston, Tex.	37.00	39.00
Johnstown, Pa.	44.00	46.00
Kansas City, Mo.	39.50	41.50
Kokomo, Ind.	42.00	44.00
Los Angeles	35.00	37.00
Middletown, O.	43.00	45.00
Midland, Pa.	44.00	46.00
Minnequa, Colo.	38.00	40.00
Monessen, Pa.	44.00	46.00
Phoenixville, Pa.	42.50	44.50
Pittsburg, Calif.	35.00	37.00
Pittsburgh, Pa.	44.00	46.00
Portland, Oreg.	35.00	37.00
Portsmouth, O.	42.00	44.00
St. Louis, Mo.	41.00	43.00
San Francisco	35.00	37.00
Seattle, Wash.	35.00	37.00
Sharon, Pa.	44.00	46.00
Sparrows Pt., Md.	42.00	44.00
Steubenville, O.	44.00	46.00
Warren, O.	44.00	46.00
Weirton, W. Va.	44.00	46.00
Youngstown, O.	44.00	46.00

Differentials from Base

Differentials per gross ton for other grades of dealer and industrial scrap:

O-H and Blast Furnace Grades

2. No. 1 Busheling	Base
3. No. 1 Heavy Melting	—$1.00
4. No. 2 Heavy Melting	— 1.00
5. No. 2 Bundles	— 1.00
6. Machine Shop Turnings	—10.00
7. Mixed Boring & Short Turnings	— 6.00
8. Shoveling Turnings	— 6.00
9. No. 2 Busheling	— 4.00
10. Cast Iron Borings	— 6.00

Elec. Furnace and Fdry. Grades

11. Billet, Bloom & Forge Crops	+ 7.50
12. Bar Crops & Plate	+ 5.00
13. Cast Steel	+ 5.00
14. Punchings & Plate Scrap	+ 2.50
15. Electric Furnace Bundles	+ 2.00
Cut Structurals & Plate:	
16. 3 feet and under	+ 3.00
17. 2 feet and under	+ 5.00
18. 1 foot and under	+ 6.00
19. Briquetted Cast Iron Borings	Base
Foundry, Steel:	
20. 2 feet and under	Base
21. 1 foot and under	+ 2.00
22. Springs and Crankshafts	+ 1.00
23. Alloy Free turnings	— 3.00
24. Heavy Turnings	— 1.00
25. Briquetted Turnings	Base
26. No. 1 Chemical Borings	— 3.00
27. No. 2 Chemical Borings	— 4.00
28. Wrought Iron	+10.00
29. Shafting	+10.00
30. Hard Steel cut 2 ft & under	+ 5.00
31. Old Tin & Terne Plated Bundles	—10.00

Unprepared Grades

When compressed constitutes:

32. No. 1 Bundles	6.00
33. No. 2 Bundles	9.00
34. Other than material suitable for hydraulic compression	— 8.00

Restrictions on Use

(1) Prices for Grades 11 and 23 may be charged only when shipped to a consumer directly from an industrial producer; otherwise ceiling prices shall not exceed prices establishd for Grades 12 and 8, respectively.

(2) Prices established for Grades 26 and 27 may be charged only when sold for use for chemical or annealing purposes, and in the case of Grade 27, for briquetting and direct charge into an electric furnace; otherwise ceiling prices shall not exceed price established for Grade 10.

(3) Prices established for Grade 28 may be charged only when sold to a producer of wrought iron; otherwise ceiling price shall not exceed ceiling price for corresponding grade of basic open-hearth.

(4) Premiums for Grades 11-18, 20 and 21 may be charged only when sold for use in electric and open-hearth furnaces or foundries.

(5) Prices for Grade 29 may be charged only when sold for forging or rerolling purpose.

(6) Prices for Grade 30 may be charged only when sold to a gray iron foundry; otherwise price for Grade 20 will prevail.

Special Pricing Provisions

(1) Sellers of Grades 26 and 27 may make an extra charge of $1.50 per ton for loading in box cars, or 75 cents per ton for covering gondola cars with a weather-resistant covering.

(2) Ceiling price of pit scrap, ladle scrap, salamander scrap, skulls, skimmings or scrap recovered from slag dumps and prepared to charging box size, shall be computed by deducting from the price of No. 1 heavy melting steel of dealer and industrial origin, the following amounts: Where iron content is 85% and over, $6; 75% and over, $10; less than 75%, $12.

(3) Ceiling price of any inferior grade of scrap not listed shall not exceed the price of No. 1 bundles less $15.00.

Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 railroad heavy melting steel) for other grades of railroad steel scrap.

2. No. 2 Heavy melting Steel	—$2.00
3. No. 2 Steel Wheel	Base
4. Hollow Bored Axles and loco. axles with keyways between the wheelseats.	Base
5. No. 1 Busheling	— 3.50
6. No. 1 Turnings	— 3.00
7. No. 2 Turnings, Drillings & Borings	—12.00
8. No. 2 Cast Steel and uncut wheelcenters	— 6.00
9. Uncut Frogs, switches.	Base
10. Flues, Tubes & Pipes	— 8.00
11. Structural, Wrought Iron and/or steel, uncut	— 6.00
12. Destroyed Steel Cars	— 8.00
13. No. 1 Sheet Scrap	— 9.50
14. Scrap Rails, Random Lengths	+ 2.00
15. Rerolling Rails	+ 7.00
Cut Rails:	
16. 3 feet and under	+ 5.00
17. 2 feet and under	+ 6.00
18. 18 inches and under	+ 8.00
19. Cast Steel, No. 1	+ 3.00
20. Uncut Tires	+ 2.00
21. Cut Tires	+ 5.00
Bolsters & Side Frames:	
22. Uncut	Base
23. Cut	+ 3.00
24. Angle, Splice Bars & Tie Plates	+ 5.00
25. Solid Steel Axles	+12.00
26. Steel Wheels, No. 3 oversize	Base
27. Steel Wheels, No. 3	+ 5.00
28. Spring Steel	+ 5.00
29. Couplers & Knuckles	+ 5.00
30. Wrought Iron	+ 8.00
31. Fireboxes	— 8.00
32. Boilers	— 6.00
33. No. 2 Sheet Scrap	—13.00
34. Carsides, Doors, Car Ends, cut apart	— 6.00
35. Unassorted Iron & Steel	— 6.00
36. Unprepared scrap, not suitable for hydraulic compression	— 8.00

Restrictions on Use

(1) Price established for Grade 15 may be charged only when purchased and sold for rerolling uses; otherwise, ceiling shall not exceed that for Grade 14.

(2) Price established for Grade 30 may be charged only when sold to a producer of wrought iron; otherwise, ceiling shall not exceed that for No. 1 heavy melting steel.

(3) Price for Grade 25 may be charged only when sold for rerolling and forging purposes; otherwise ceiling shall not exceed that for base grade (No. 1.)

CAST IRON SCRAP

Ceiling price per gross ton for following grades shall be f.o.b. shipping point:

Cast Iron:

1. No. 1 (Cupola)	$49.00
2. No. 2 (Charging Box)	47.00
3. No. 3 (Hvy. Breakable)	45.00
4. No. 4 (Burnt Cast)	41.00
5. Cast Iron Brake Shoes	41.00
6. Stove Plate	46.00
7. Clean Auto Cast	52.00
8. Unstripped Motor Blocks	43.00
9. Wheels, No. 1	47.00
10. Malleable	55.00
11. Drop Broken Machinery	52.00

Restrictions on Use

(1) Ceiling shipping point price which a basic open-hearth consumer may pay for No. 1 cast iron, clean auto cast, malleable or drop broken machinery cast shall be ceiling price for No. 2 charging box cast.

(2) Ceiling shipping point price which any foundry other than a malleable iron producer may pay for Grade 10 shall be ceiling price for No. 1 cast iron.

Preparation Charges

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of dealer or industrial origin authorized by OPS are:

(1) For preparing into Grades No. 3, No. 4 or No. 2, $8.

(2) For hydraulically compressing Grade No. 1, $6 per ton; Grade No. 3, $8.

(3) For crushing Grade No. 6, $3. For preparing into:

(4) Grade No. 25, $6.

(5) Grade No. 19, $6.

(6) Grades No. 12, No. 13, No. 14, No. 16, or No. 20, $10.

(7) Grade No. 17 or No. 21, $11.

(8) Grade No. 18, $12.

(9) For hydraulically compressing Grade No. 15, $8.

(10) For preparing into Grade No. 28, $10.

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of railroad origin shall be:

(1) For preparing into Grade No. 1 and Grade No. 2, $8.

(2) For hydraulically compressing Grade No. 13, $6. For preparing into:

(3) Grade No. 16, $4.

(4) Grade No. 17, $5.

(5) Grade No. 18, $7.

(6) Grade No. 21, $4.

(7) Grade No. 23, $4.

Ceiling fees per gross ton which may be charged for intransit preparation of cast iron are limited to:

(1) For preparing Grade No. 8 into grade No. 7, $9.

(2) For preparing Grade No. 3 into Grade No. 11, $7.

(3) For preparing Grade No. 3 into Grade No. 1, $4.

Whenever scrap has arrived at its point of delivery and consumer engages a dealer to prepare such scrap, no fee may be charged for such services unless consumer obtains prior written OPS approval.

Commissions

No commission shall be payable to a broker in excess of $1.

Premiums for Alloy Content

No premium may be charged for alloy content except: $1.25 per ton for each 0.25% of nickel where scrap contains not less than 1% and not over 5.25% nickel; $2 per ton for scrap containing not less than 0.15 per cent molybdenum and $3 for scrap containing not less than 0.65% molybdenum; for scrap containing not less than 10% manganese, $4 for scrap in sizes larger than 12 x 24 x 8 in., and $14 for scrap cut in that size or smaller (applicable only if scrap is sold for electric furnace uses or on NPA allocation); $1 for scrap conforming to SAE 52100.

Switching Charges

Switching charges to be deducted from basing point prices of dealer, industrial and nonpeeling railroad scrap, to determine ceiling shipping point prices for scrap originating in basing points are per gross ton:

Alabama City, Ala., 43c; Ashland, Ky., 47c; Atlanta, 51c.

Bethlehem, Pa., 52c; Birmingham, 50c; Brackenridge, Pa., 53c; Buffalo, 83c; Butler, Pa., 65c.

Canton, O., 51c; Chicago (including Gary, Ind.), $1.34; Cincinnati (including Newport, Ky.), 65c; Claymont, Del. (including Chester, Pa.), 79c; Cleveland, 76c.

Coatesville, Pa., 50c; Conshohocken, Pa., 20c.

Detroit, 95c; Duluth, Minn., 50c.

Harrisburg, Pa., 51c; Houston, 57c.

Johnstown, Pa., 73c.

Kansas City, Mo., 78c; Kokomo, Ind., 51c.

Middletown, O., 26c; Midland, Pa., 75c; Minnequa, Colo., 33c; Monessen, Pa., 51c.

Phoenixville, Pa., 51c; Pittsburg, Calif., 65c; Pittsburgh (including Bessemer, Homestead, Duquesne, Munhall), 99c; Portland, Oreg., 52c; Portsmouth, O., 51c.

St. Louis (including Federal, Granite City, E. St. Louis, Madison, Ill.), 51c; San Francisco (including So. San Francisco, Niles, Oakland), 66c; Seattle, 59c; Sharon, Pa., 75c; Sparrows Point, Md., 20c; Steubenville, O., 51c.

Warren, Pa., 75c; Weirton, 70c.

Youngstown, 75c.

HAMILTON, ONT.

(Delivered Prices)

Heavy Melt.	$35.00
No. 1 Bundles	35.00
No. 2 Bundles	34.00
Mechanical Bundles	33.00
Mixed Steel Scrap	31.00
Mixed Borings, Turnings	28.00
Rails, Remelting	35.00
Rails, Rerolling	38.00
Bushelling	29.50
Bushelings new factory:	
Prep'd.	33.00
Unprep'd.	28.00
Short Steel Turnings	28.00
Cast Iron Grades*	
No. 1 Machinery Cast.	58.00-60.00

* F.o.b. shipping point.

uncut frogs and switches

use:

Uncut frogs and switches are a good grade of scrap for the Open Hearth Furnace when they are cut to not more than 5 feet in length to fit the charging pan. Being a heavy scrap, it offers an economical charge and is relatively free of oxide, dirt and rust. This type of scrap is also valuable when cut and utilized as rail crop.

source:

Obsolete railroad frogs and switches.

This is one of a series illustrating the many and varied types of scrap required in the making of iron and steel for every use. Our national organization, manned by personnel who is steeped in every phase of scrap knowledge, is ready to meet your every scrap problem.

specifications:

Uncut Frogs and Switches with or without Manganese (A.A.R. Nos. 18 & 18-A) Steel and/or iron frogs and switches that have not been cut apart. May include Manganese.

CONSULT OUR NEAREST OFFICE FOR THE PURCHASE AND SALE OF SCRAP

LURIA BROTHERS AND COMPANY, INC.

PLANTS

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BOSTON, MASS. — Statler Building
CLEVELAND, OHIO — 1022 Midland Bldg.
LEBANON, PENNA. — Luria Building
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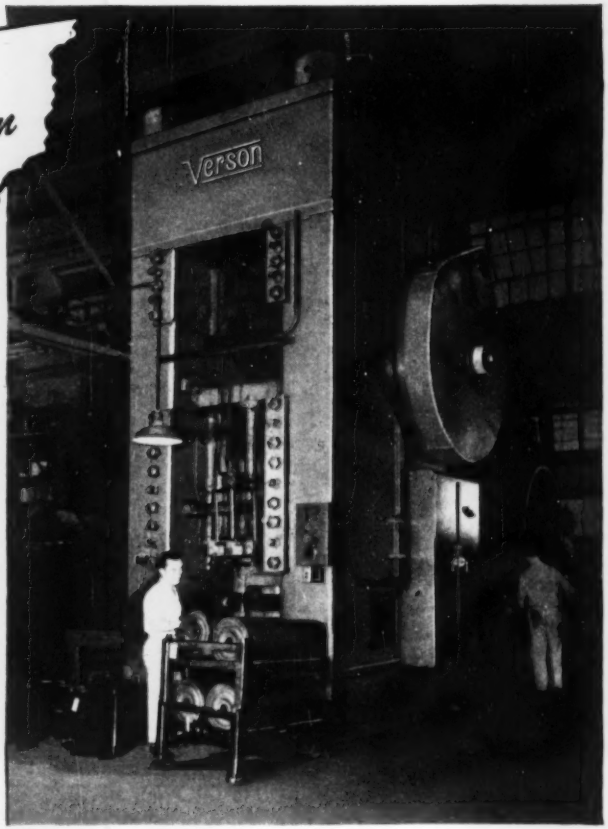
LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Can you match these production figures?

THIS Verson KNUCKLE JOINT PRESS forms 260 flywheels per hour



In the plant of a leading automobile manufacturer, the 2000 ton Verson Knuckle Joint Press illustrated stamps out automatic drive flywheels at the rate of 260 per hour. A flat blank is transformed into a flywheel ready for machining in a single operation in less than 14 seconds!

The acceptance of press forming of precision parts under tremendous force is growing rapidly. By using the knuckle joint's characteristic of applying high pressure over a concentrated area it is often possible to produce superior quality parts at a substantially higher rate and at a fraction of the cost of conventional methods.

Verson Knuckle Joint Presses meet all requirements for work of this type. Their rugged, all steel construction in combination with Verson design gives them the accuracy, power, speed and dependability so vital to this type of service. Write for complete details outlining the nature of your problem.

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The Metal Market

Allocations of copper must be cut substantially over balance of 1951 as shortage becomes acute. Government urges use of alternate material where possible

GOVERNMENT officials foresee no improvement in copper supplies for months ahead. They are urging consumers to start using an alternate material immediately if possible. The outlook for copper is the darkest of all major strategic materials.

Loss of copper ore tonnage due to work stoppage in the industry in July, as well as the critical shortage of copper and copper-base alloy scrap, will restrict the availability of copper raw materials at least through first quarter of 1952. Allocations to many consumers will be curtailed sharply over the balance of this year.

Because of the gravity of the copper scrap situation, measures are under way to accelerate the flow of this material to secondary producers. Among measures being taken by NPA are a revision of copper raw materials order M-16 to change the inventory restriction from a 60 to a 30-day inventory of scrap, and a nation-wide nonferrous scrap recovery campaign.

Projects are under way in the United States and South America to increase the production of copper ore. However, domestic deposits now being developed are extremely low-grade and difficult processing problems are anticipated. The new tonnage will help maintain rather than expand domestic output of copper.

A government pamphlet outlines the general materials situation as follows: "Copper supplies are almost dangerously short . . . Suspension of tin purchases due to excessive prices has resulted in considerable reduction in tin's industrial stocks. Lead and zinc production has been hampered by strikes, reduced imports and inadequate scrap collections. Aluminum production also has suffered from strikes, along with scrap and water power shortages. Magnesium, with considerably smaller production but similar difficulties, has nearly maintained its position."

NPA Allocates Imported Lead

Wider distribution of imported pig lead is assured by bringing this tonnage within the scope of NPA allocation procedures. Imported pig lead amounts normally to about one-third of the total available supply in this country. As a result of this action, all consumers will be able to share in the available supply of imported lead, whereas at present only a relatively few consumers use that source of supply.

As of Nov. 1, no person can accept delivery of soft primary pig lead or imported pig lead for any purpose except in accordance with terms of monthly allocation authorizations issued by NPA. An allocation authorization will permit the person to whom it is issued to accept delivery of lead in a specified quantity, provided that an order is received by a supplier not later than the fifth day of the month in which delivery is requested.

Under normal conditions, the United States would have about 110,000 tons available for distribution each month. This would include domestic soft primary pig lead, lead scrap and imported pig lead, in roughly the same proportions. Requests for pig lead in October approximated 128,000 tons, or more than five times the 23,000 tons of domestic soft pig lead available for allocation.

Scrap Metal Campaign Starts

A nonferrous industry scrap mobilization committee was organized to find a solution to the growing crisis in that material. The nonferrous scrap program covers copper, brass, bronze, lead and aluminum.

Officers of the committee are: T. E. Veltfort, manager, Copper & Brass Research Association, New York, chairman; M. L. Tressell, Aluminum Co. of America, Pittsburgh, vice chairman; Paul Herzog, Federated Metals Division, American Smelting & Refining Co., New York, secretary-treasurer.

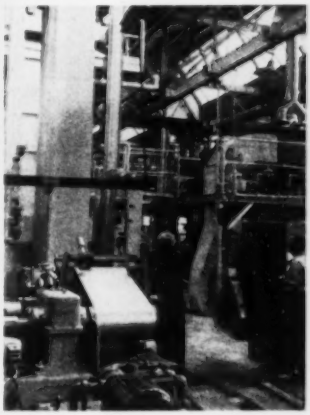
The executive committee is composed of the officers and the following: John Lennon, American Metal Co. Ltd., New York; L. S. Thomas, General Smelting Co., Philadelphia; Donald S. Levison, Tomka Aluminum Division, Baltimore; Otto Barth, Barth Smelting Corp., Newark, N. J.; E. A. Bergman, U. S. Reduction Co., E. Chicago, Ind.; Samuel Friedman, Orchard Refining & Smelting Works, Newark.

First quarter supply of copper scrap will fail to match requirements by about 50,000 tons. Aluminum scrap shortage has forced the shutdown of some secondary smelters and reduced operations at many others to less than half normal capacity. Lead scrap, which represents about one-third of the available supply of that metal, is critically scarce.

STEEL'S Metal Price Averages for Oct., 1951

(Cents per pound)

Electrolytic Copper, del. Conn.	24.500
Lead, St. Louis	18.726
Prime, Western Zinc, E. St. Louis	19.426
Straits Tin, New York	103.00
Primary Aluminum ingots, del	19.000
Antimony, f.o.b. Laredo, Tex.	42.000
Nickel, f.o.b. refinery	56.500
Silver, New York	88.120



MODERNIZATION: To produce products of superior finish and increased accuracy of gage, Chase Brass & Copper Co. has installed new equipment in its plants at a cost of over $4 million. One of the most modern pieces of equipment at its Waterbury, Conn., Works is the tremendous vertical strip annealer shown above. It was necessary to tear out a large section of a building to provide space for the machine

Glidden Opens Zinc Property

Half the cost of exploratory diamond drilling on Glidden Co.'s zinc properties in Shasta county, California, will be borne by the government. In a contract signed by Dwight P. Joyce, president of Glidden, and Defense Minerals Administration, the company agreed to start drilling operations on the property within 60 days.

When Glidden Co., Cleveland, acquired the zinc properties the price of zinc concentrates was $60 a ton. The price rapidly dropped to $33 a ton and plans to operate the properties were abandoned until such time as zinc concentrate prices would afford a margin of profit.

Present price of zinc concentrates is $135 a ton and likely to go higher. As a result, the government has been urging Glidden to open up the properties. If the exploratory drilling confirms an earlier estimate of 225,000 tons of zinc ore reserves on the properties, underground mining operations will begin at the earliest practicable date.

Zinc ores in Glidden's properties contain a considerable amount of cadmium, amounting to about 100 pounds per ton of concentrate. Present price of cadmium is $2.55 a pound. If extraction of cadmium from the concentrates proves economically feasible, the cadmium in a ton of ore will be worth about $255.

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 24.50c, Conn. Valley; Lake 24.62½c, delivered.

Brass Ingots: 85-5-5-5 (No. 115) 27.25c; 88-10-2 (No. 215) 38.50c; 80-10-10 (No. 305) 32.25c; No. 1 yellow (No. 405) 23.25c.

Zinc: Prime western 19.50c; brass special 19.75c; intermediate 20.00c, East St. Louis; high grade 20.85c, delivered.

Lead: Common 18.80c; chemical 18.90c; corroding 18.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 19.00c, pigs 18.00c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb c.l. orders.

Secondary Aluminum: Piston alloys 20.50c; No. 12 foundry alloy (No. 2 grade) 19.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 18.00c; grade 2, 17.75c; grade 3, 17.25c; grade 4, 16.50c.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over 24.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt 103.00.

Antimony: American 99-99.8% and over but not meeting specifications below 42.00c; 99.8% and over (arsenic 0.05% max.; other impurities 0.1% max.) 42.50c; f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 56.50c; 25-lb pigs, 59.15c; "XX" nickel shot, 60.15c; "F" nickel shot or ingots, for addition to cast iron, 56.50c. Prices include import duty.

Mercury: Open market, spot, New York, $220-$222 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $1.56 per lb of alloy, f.o.b., Reading, Pa.

Cadmium: "Regular" straight or flat forms, $2.55 del.; special of patented shapes $2.80.

Cobalt: 97.99%, $2.40 per lb for 500 lb (kegs); $2.42 per lb for 100 lb (case); $2.47 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York 88.00c per oz.

Platinum: $90-$93 per ounce from refineries.

Palladium: $24 per troy ounce.

Iridium: $200 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Ceiling prices, cents per pound, f.o.b. mill; effective Aug. 23, 1951)

Sheet: Copper 41.68; yellow brass 38.28; commercial bronze, 95% 41.61; 90% 41.13; red brass, 85% 40.14; 80% 39.67; best quality, 39.15; nickel silver, 18% 53.14; phosphor-bronze grade A, 5% 41.07.

Rod: Copper, hot-rolled 37.53; cold-drawn 38.78; yellow brass free cutting, 32.63; commercial bronze, 95% 41.30; 90% 40.82; red brass 85% 39.83; 80% 39.36.

Seamless Tubing: Copper 41.72; yellow brass 41.29; commercial bronze, 90% 43.79; red brass, 85% 43.05.

Wire: Yellow brass 38.57; commercial bronze, 95% 41.90; 90% 41.42; red brass, 85% 40.43; 80% 39.96; best quality brass, 39.44.

(Base prices, effective Nov. 6, 1950)

Copper Wire: Bare, soft, f.o.b. eastern mills, c.l. 28.67-30.42; l.c.l. 29.17-30.92; 100,000 lb lots 28.545-30.295; weatherproof, f.o.b. eastern mills, c.l. 29.60-30.60, l.c.l. 30.10-31.10, 100-000 lb lots 29.35-30.35; magnet, del., 15,000 lb or more 34.50c, l.c.l. 35.25.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders)

Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range Inches	Widths or Diameters, In., Inc.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	30.1	....	....
0.135-0.096	12-48	30.6	....	....
0.095-0.077	12-48	31.2	29.1	33.2
0.076-0.061	12-48	31.8	29.3	33.4
0.060-0.048	12-48	32.1	29.5	33.7
0.047-0.038	12-48	32.5	29.8	34.0
0.037-0.030	12-48	32.9	30.2	34.6
0.029-0.024	12-48	33.4	30.5	35.0
0.023-0.019	12-36	34.0	31.1	35.7
0.018-0.017	12-36	34.7	31.7	36.6
0.016-0.015	12-36	35.5	32.4	37.6
0.014	12-24	36.5	33.3	38.9
0.013-0.012	12-24	37.4	34.0	39.7
0.011	12-24	38.4	35.0	41.2
0.010-0.0095	12-24	39.4	36.1	42.7
0.009-0.0085	12-24	40.6	37.2	44.4
0.008-0.0075	12-24	41.9	38.4	46.1
0.007	12-18	43.3	39.7	48.2
0.006	12-18	44.8	41.0	52.8

* Lengths 72 to 180 inches. † Maximum diameter, 26 inches.

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or distance across flats	—Round— R317-T4, T58-T5	R317-T4	—Hexagonal— T58-T4
0.125	52.0	....	....
0.156-0.0188	44.0	....	....
0.219-0.313	41.5	....	....
0.375	40.0	46.0	48.0
0.406	40.0	....	....
0.438	40.0	46.0	48.0
0.469	40.0	....	....
0.500	40.0	46.0	48.0
0.531	40.0	....	....
0.563	40.0	....	45.0
0.594	40.0	....	....
0.625	40.0	43.5	45.0
0.688	40.0	....	45.0
0.750-1.000	39.0	41.0	42.5
1.063	39.0	....	41.0
1.125-1.500	37.5	39.5	41.0
1.563	37.0	....	....
1.625	36.5	....	39.5
1.688-2.000	36.5	....	....

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more $24.00 per cwt; add 50c cwt 10 sq ft to 140 sq. ft. Pipe: Full coils $24.00 per cwt. Traps and bends: List prices plus 80%.

ZINC

Sheets, 26.50c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 25.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 24.50-26.50c; over 12-in., 24.50-26.50c.

"A" NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 77.00c. Strip, cold-rolled, 83.00c. Rods and shapes, 73.00c. Plates, 75.00c. Seamless tubes, 106.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 60.50c. Strip, cold-rolled 63.50c. Rods and shapes, 58.50c. Plates, 59.50c. Seamless tubes, 93.50c. Shot and blocks, 53.50c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.31 in. in diameter, less than 25 lb, 55.00-62.00c; 25 to 99 lb, 45.00-52.00c; 100 lb to 5000 lb, 41.00c.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, $6.

DAILY PRICE RECORD

1951	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Nov. 1	24.50	18.80	19.50	103.00	19.00	42.00	56.50	88.00
Oct. 5-31	24.50	18.80	19.50	103.00	19.00	42.00	56.50	88.00
Oct. 4	24.50	18.80	19.50	103.00	19.00	42.00	56.50	84.75
Oct. 2-3	24.50	18.80	19.50	103.00	19.00	42.00	56.50	90.16
Oct. 1	24.50	18.80	17.50	103.00	19.00	42.00	56.50	90.16
Oct. Avg.	24.50	18.726	19.426	103.00	19.00	42.00	56.50	88.12
Sept. Avg.	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
Aug. Avg.	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
July Avg.	24.50	16.80	17.50	106.00	19.00	42.00	56.50	90.16
June Avg.	24.50	16.80	17.50	117.962	19.00	42.00	56.50	88.492
May Avg.	24.50	16.80	17.50	139.923	19.00	42.00	53.50	90.16
Apr. Avg.	24.50	16.80	17.50	145.735	19.00	42.00	50.50	90.16
Mar. Avg.	24.50	16.80	17.50	145.730	19.00	42.00	50.50	90.16

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked. Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

Plating Materials

Chromic Acid: 99.9% flakes, f.o.b. Philadelphia, carloads, 27.00c; 5 tons and over 27.50c; 1 to 5 tons, 28.00c; less than 1 ton 28.50c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat, rolled, 38.34c; oval 37.84c.

Nickel Anodes: Rolled oval, carbonized, carloads, 74.50c; 10,000 to 30,000 lb, 75.50c; 3000 to 10,000 lb, 76.50c, 500 to 3000 lb 77.50c; 100 to 500 lb, 79.50c; under 100 lb, 82.50c; f.o.b. Cleveland.

Nickel Chloride: 36.50c in 100 lb bags; 34.50c in lots of 400 lb through 10,000 lb; 34.00c over 10,000 lb, f.o.b. Cleveland, freight allowed on 400 lb or more.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 77.7c; 100 or 350 lb drums only, 100 to 600 lb, 63.1c; 700 to 1900 lb, 60.6c; 2000 to 9900 lb, 58.9c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Tin Anodes: Bar, 1000 lb and over, $1.19; 500 to 999 lb, $1.195; 200 to 499 lb, $1.20; less than 200 lb, $1.215. Freight allowed east of Mississippi and north of Ohio and Potomac.

Zinc Cyanide: 100 lb drums, less than 10 drums 47.7c, 10 or more drums, 45.7c, f.o.b. Niagara Falls, N. Y.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb $1.0009; more than 2000 lb, 98.09c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Stannous Chloride (Anhydrous): In 400 lb bbl, 87.23c; 100 lb kegs 88.23c. Freight allowed.

Scrap Metals

Brass Mill Allowances

Ceiling prices in cents per pound for less than 20,000 lb, f.o.b. shipping point, effective June 26, 1951.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.50	21.50	20.75
Yellow Brass	19.125	18.875	17.875
Commercial Bronze			
95%	20.50	20.25	19.75
90%	20.50	20.25	19.75
Red Brass			
85%	20.25	20.00	19.375
80%	20.125	19.875	19.375
Muntz metal	18.125	17.875	17.375
Nickel silver, 10%	21.50	21.25	10.75
Phos. bronze, 5%	25.25	25.00	24.00

Copper Scrap Ceiling Prices

(Base prices, cents per pound, less than 40,000 lb f.o.b. point of shipment)

Group 1: No. 1 copper 19.25; No. 2 copper wire and mixed heavy 17.75; light copper 16.50; No. 1 borings 19.25; No. 2 borings 17.75; refinery brass, 17.00 per lb of dry Cu content for 50 to 60 per cent material and 17.25 per lb for over 60 per cent material.

Group II: No. 1 soft red brass solids 18.50; No. 1 composit on borings 19.25 per lb of Cu content plus 63 cents per lb of tin content; mixed brass borings 19.25 per pound of Cu content plus 60 cents per lb of tin content; unlined red car boxes 18.25; lined red car boxes 17.25; cocks and faucets 16.00; mixed brass screens 16.00; zincy bronze solids and borings 16.25.

Zinc Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment)

Unsweated zinc dross, 13.75c; new clippings and trimmings, 15.50c; engravers' and lithographers' plates, 15.50c; die cast slabs, min. 90% zinc, 13.75c; old zinc scrap, 12.25c; forming and stamping dies, 12.25c; new die cast scrap, 11.75c; old zinc die cast radiator grille, 11.50c; old die cast scrap, 10.50c.

Lead Scrap Ceiling Prices

(F.o.b. point of shipment)

Battery lead plates, 19.00c per lb of lead and antimony content, less smelting charge of 2 cents per lb of material in lots 15,000 lb or more; less 2.25c in lots less than 15,000 lb, or a flat price of 11.25c a pound of battery plates. Used storage batteries (in boxes) drained of liquid, 7.65c for 15,000 lb or more; 7.45c for less than 15,000 lb. Soft lead scrap, hard lead scrap, battery slugs, cable lead scrap or lead content of lead-covered cable scrap, 17.25c in lots of 20,000 lb or more; 16.50c in lots under 20,000 lb.

Aluminum Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment, less than 5000 lb)

Segregated plant scrap: 2s solids, copper free, 10.50, high grade borings and turnings, 8.50; No. 12 piston borings and turnings, 7.50; Mixed plant scrap: Copper-free solids, 10.00 dural type, 9.00; Obsolete scrap: Pure old cable, 10.00; sheet and sheet utensils, 7.25; old castings and forgings, 7.75; clean pistons, free of struts, 7.75; pistons with struts, 5.75.

Sheets, Strip . . .

Sheet and Strip Prices, Page 163 & 164

Philadelphia—Sheet consumers now in the market for January on a first-come first-served basis find pickings slim for the reason their requests exceed supply. The mills have been called upon to set aside only 10 per cent of their scheduled production to meet these requests and, further, since that regulation was first established some producers have had their January production schedules reduced by the government so that steel might be diverted to other more stringent products, notably plates. Overall, in spite of the fact sheet demand continues in excess of supply, there is less urgency for sheets than for plates, shapes and bars. This is ascribed to cutbacks in automobile production and to an easing in demand in certain consumer durable lines.

Boston—Further slight easing in flat-rolled steel demand, notably low carbon strip and sheet specialties, is apparent. An exception is galvanized where limited zinc supply holds down output.

Pittsburgh—Producers see no appreciable letdown in demand during the next six months. Some booking of second quarter business is reported, primarily for defense purposes.

Cleveland — Cutbacks in civilian durable goods production have resulted in no substantial easing in sheet supply conditions. Rising requirements on defense and defense-support account are taking up any slack that appears. Substantial portion of rolling time on continuous mills is devoted to producing light plates, and this, of course, means just so much less sheet tonnage.

Cincinnati—District sheet mills are pushing production to the limit in efforts to avoid carryover into next quarter. Overall demand is well sustained.

Chicago—Sheetmakers report customers are not cancelling or adjusting orders for fourth quarter in line with NPA instructions regarding third quarter tonnage not shipped by Oct. 7. The Oct. 31 deadline for such readjustment apparently spurred no action on the part of consumers. Mills report many fourth quarter CMP tickets still uncashed.

Tin Plate . . .

Tin Plate Prices, Page 164

Washington—An export licensing quota of 115,000 short tons of tin plate primes and seconds for food packing and petroleum packaging has been established for first quarter 1952 by the Office of International Trade. In addition, 9000 short tons of unmended menders and 12,500 short tons of waste-waste tin plate and terneplate for export may be licensed.

Of the 115,000-ton quota, 99,000 tons will be licensed for food packing and 16,000 tons for petroleum packaging. In fourth quarter the export quota was 125,000 tons, of which 120,000 were for food packing and 5000 for petroleum packaging.

In 1949, quarterly average exports of tin plate amounted to 130,500 tons.

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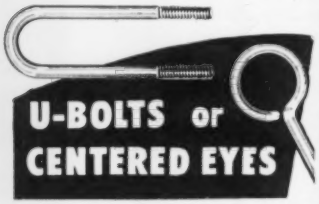

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Semifinished Steel . . .

Semifinished Prices, Page 163

Birmingham—Operations of Tennessee Coal, Iron & Railroad Co. here were seriously hampered last week when 100 coke oven workers walked off their jobs at Fairfield. The company immediately announced banking of several blast furnaces and said nine of the 19 open hearths had been "greatly slowed down."

Steel Bars . . .

Bar Prices, Page 163

Pittsburgh—Bars are in heavy demand with little relief seen for the immediate future. Cancellations of unshipped third quarter tonnage have been so slight mills have little open rolling capacity to offer holders of unplaced fourth quarter CMP tickets. A district tool producer last week told a Senate subcommittee he has been forced to run his plant at 40 per cent of capacity the last six months due to lack of steel. His allotments for the first quarter of 1952 will leave him far short of his break-even point.

Boston — Some electric furnace grades of alloy bars are in more ample supply with bonus tonnage available in scattered cases.

Philadelphia—With the opening of books for January on a basis of first-come first-served for 10 per cent of their scheduled production, hot carbon bar producers find themselves swamped with more tonnage than they can handle. Next to plates, bars are generally regarded by steel people as the most stringent item. On some of the larger sizes, some producers are far in arrears.

Cleveland — Rising direct defense requirements are being reflected in increasing tightness in steel bar supply. Large rounds for shell stock have been in heavy demand on government account, and expectations are this class of demand will continue to absorb a substantial part of supply indefinitely. Cutbacks in auto production and other civilian goods are not likely to materially ease supply conditions insofar as alloy bars are concerned with military and related defense requirements rising, and months distant from peak.

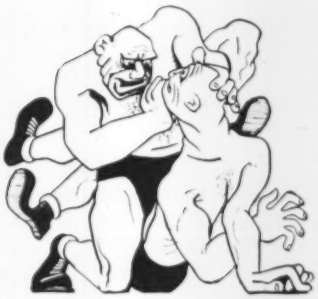
Chicago—There is speculation as to whether the bringing of conversion steel under CMP control is going to lessen consumer interest in this material. Now that automakers are coming under CMP allotments such a development would not be surprising. Agricultural implement makers, short in covering on bar needs, are showing new interest in conversion tonnage.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 163

Los Angeles — Increasing demand arising from industrial construction coupled with diversion by producers of ingot tonnage to other products has tightened the pinch for reinforcing bars.

Seattle—Bar mills hold heavy order backlogs, bulk of which is for reinforcing, and largely for public works. Small tonnage inquiry is ac-



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tive. Sizable projects, involving reinforcing, are expected to come out for bids within the next 60 days.

Galvanized Products Raised

Pittsburgh—Increases in prices of about ⅛ cent per pound on galvanized sheets, pipe and various wire and wire products have been effected by subsidiaries of the U. S. Steel Corp. to offset the recent 2 cent per pound increase in the price of zinc. The higher galvanized product prices were approved by the Office of Price Stabilization following a notification period. Other producers are expected to take similar action.

Wire . . .

Wire Prices, Page 165

Boston—Stringency in wire products varies with the hundreds of items produced. Deliveries on some are near normal while others are extended weeks beyond the usual processing period.

Cleveland—Wiremakers report demand in all categories is as strong as ever and there is little prospect of any change in tight supply conditions through first quarter. Shortage of zinc is hampering production of galvanized wire.

Structural Shapes . . .

Structural Shape Prices, Page 163

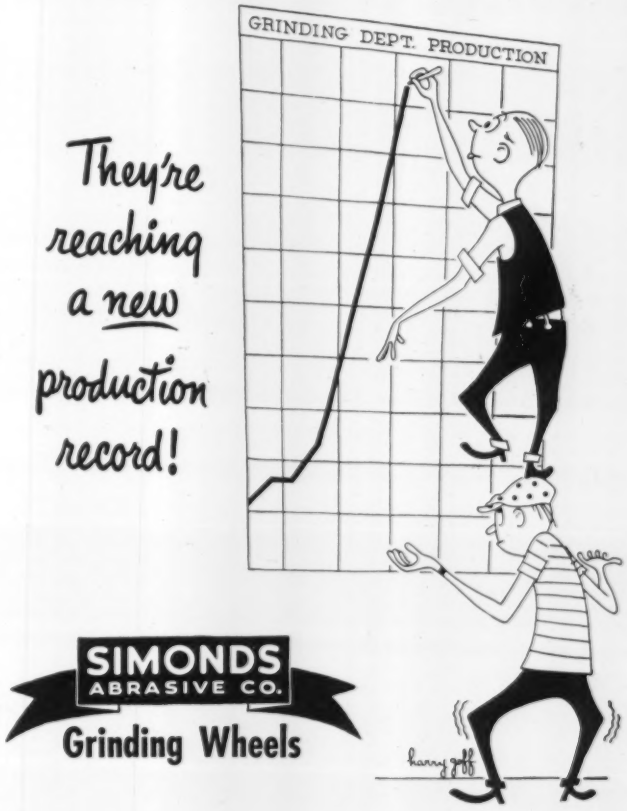
Boston—As the volume of fabricated structural work contracts signs appear pointing to some return to competitive prices, notably when delivery is a factor.

Philadelphia — Structural inquiry continues to decline, due primarily to government restrictions. Shops are mainly concerned with obtaining enough plain material to sustain operations on present backlogs, but are increasingly interested in how rapidly these backlogs are going to shrink without some change in federal restrictions. Actually some trade leaders believe stringency in shapes will reasonably soon prove to be less acute than Washington now believes.

Pittsburgh—Structurals of all types continue in extremely short supply. Mills see no prospect of early improvement in the situation. Few cancellations have been received by the mills due to third quarter carryovers. Fabricators report their orders in many instances are being moved back in mill delivery schedules.

Cleveland—Seasonal influences normally are reflected in a slackening in new rebuilding projects about this time of year, but currently, government restrictions on construction are exerting still greater retarding influence. With defense work holding preference in the matter of structural shape supply, fabricators are more concerned with getting steel tonnage to care for work already under contract than they are in booking forward business. Large volume of school construction is proposed for this general area, subject to voters' approval.

Seattle — Substantial structural shape tonnages, mostly for public works and defense projects, are pending here. Washington state highway



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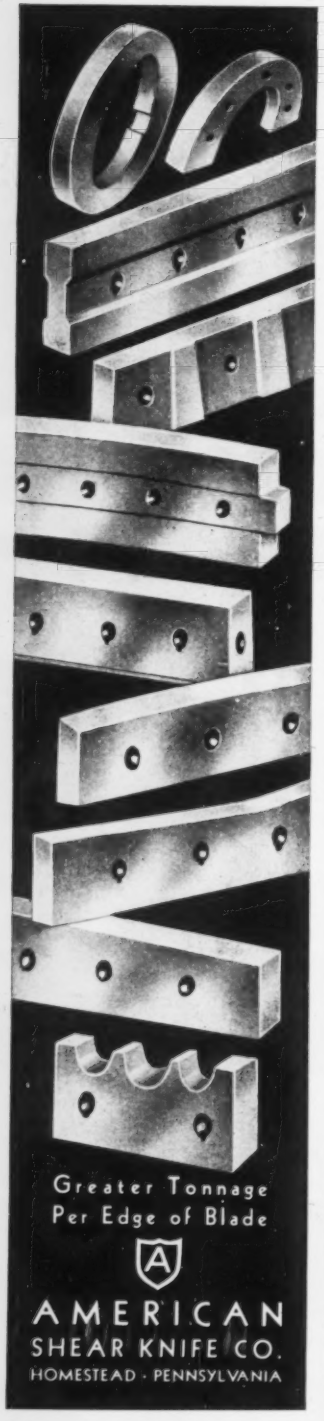


officials expect allocations for all important road jobs in their 1952 program.

Plates . . .

Plate Prices, Page 163

Philadelphia—Of all major products, plates continue in outstanding demand. This is reflected in part by recent cutbacks in such programs as freight cars and shipbuilding. Production hasn't been stepped up to the peaks of World War II, when strip plate played a more important part than it does today. At the same time there is not anywhere near the ship work which dominated the plate market in that period, to say nothing of certain other "all-out" needs that do not exist in the same measure today. Yet there is unquestioned stringency at the moment. Heavy tonnage is going into the petroleum and chemical industries, which is probably the nearest approach to ship demand of World War II, with a gradual stepping up in requirements for combat tanks and other type of armament.

Boston—Set-aside volume, 10 per cent of estimated production of January on a first-come first-served basis, has been quickly absorbed.

Pittsburgh—Plate supply continues tight. Very few cancellations of third quarter tonnage unshipped by Oct. 7 have been received by the mills. Fabricators continue to beg for steel but are having little success in finding any available. Many customers jumped the gun and ordered ahead of the Nov. 2 opening date for January tonnage orders on a first-come first-served basis. All such orders were returned.

Birmingham—Plate users are operating on a hand-to-mouth basis except car building where allocations and preferred directives are set up. Even then, supplies are not in keeping with needs on the basis of full operating schedules.

Seattle—Shipment of 6500 tons of Japanese plates was received in this district last week and was quickly absorbed. Unstated tonnages of plates are involved in Army air base fuel installations and improvements.

Iron Ore . . .

Iron Ore Prices, Page 169

Cleveland—Lake carriers will have to bring down less than 10 million tons before the season closes to attain the 91 million ton mark. The all-time high was established in 1942 with a movement of 91,612,753 tons. Shipments are holding up well, totaling 2,403,829 tons for the week ended Oct. 29 bringing the season total to 81,771,970 tons, gain of 12,434,120 tons over a year ago.

Birmingham—The Pilgrim ore mine, four miles northwest of Gaylesville, Ala., has been reopened and is producing about 60 tons of ore daily. The mine has been inoperative for some time. The work is confined to placer mining. The ore is being shipped to Republic Steel Corp. at Gadsden.

Tubular Goods . . .

Tubular Goods Prices, Page 167

Seattle—The city of Portland has awarded 1310 tons of 42 and 30-in. cast iron pipe for a large sewer project to E. N. Hallgren Co., Seattle, for the American Cast Iron Pipe Co., Birmingham.

Pig Iron . . .

Pig Iron Prices, Page 162

Cleveland—Pressure on merchant pig iron sellers is off though demand still exceeds supply. Light foundries, however, are operating at slower pace, reflecting cutbacks in civilian goods manufacture which have not been offset by defense orders. Some shops are on 4 days, but the heavy castings producers are working to the limit of available labor supply. Shortage of skilled help is hampering expansion of schedules in shops engaged on defense contracts.

With American Steel & Wire Co. returning its idled blast furnace here to blast last week, further easing in pig iron supply is expected. The stack, which has capacity of 900 tons daily, has been down for relining since early in September. An idled stack of Republic Steel Corp., which went down for relining Sept. 22 also was restored to production last week. This stack is on basis iron.

While there are some tight areas of pig iron supply, the situation is considerably easier than it was several months back. Silvery iron stocks in the hands of consumers some weeks back were estimated at 2 months supply. Since then supplies have been cut, and indications are fourth quarter tonnage requirements will be heavier as foundry schedules expand.

Buffalo—Easing in demand for merchant pig iron reflects a tapering off in castings for civilian products. One leading motor accessory maker curtailed foundry operations substantially.

Boston—Except with basic consumers, pig iron supply is generally satisfactory. In scattered spots foundries are melting more iron, but the upturn is not general. Users of basic have to scramble for tonnage.

Philadelphia—Some badly needed additional pig iron capacity has been authorized at Bethlehem, Pa., where two blast furnaces will undergo improvements and revamping which will provide approximately the added capacity of a third furnace.

Pittsburgh—Pig iron demand here eased recently due to slower civilian durable goods production. Some area foundries could still use more iron and some others (captives) have cut their production due to cutbacks in different products using the castings. Foreign iron is still appearing in the district.

Chicago—Gray iron foundries with only small volume of defense-rated orders for castings are looking for business. Melting rates are off considerably in some cases. Pig iron demand is tapering.

Birmingham—Nine blast furnaces of the Tennessee Coal, Iron & Railroad Co. were banked last week as result of a strike at the company's by-product coke ovens in Fairfield.

Steelmaking operations, in turn, were adversely affected, some 7000 tons of steel being lost daily due to slowing down at the open hearths.

A more pleasant note for pig iron buyers was provided during the week, however, by the blowing in of Woodward Iron Co.'s new No. 4 stack at Woodward, Ala. The new furnace, first completed under government certificate of necessity since the Korean war broke out, has a capacity of 650 tons daily. It is the first new merchant blast furnace to be built in this district since 1908.

OPS Casting Order Changed

Washington—Metal casting ceiling price regulation has been revised by OPS in a move designed to correct certain inequities and, at the same time, clarify several provisions in the order. None of the changes modify the basic ceiling price level.

Scrap . . .

Scrap Prices, Page 170

Pittsburgh—Effort is being made to eliminate upgrading in the industry as a result of amendment 5 to price regulation 5 which reduces and raises prices of different steelmaking grades. To date the scrap drive has not been of too much help as the district is humming along in high gear and consuming scrap at a terrific rate. Industry spokesmen say it is too early to predict what will happen but believe that more scrap will begin to move to the mills as a result of the recent price changes.

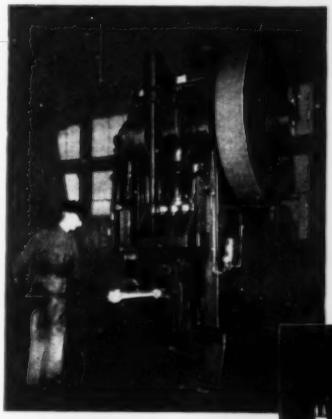
Boston—Despite the government-sponsored collection drive, scrap inventories remain critical. Yard intake is heavier as result of the drive, but the material has not yet been graded in large volume for delivery. This limited steel scrap supply is responsible to a large degree for the uneven operating rate in New England, which varies from week to week as much as 10 points.

New York—Scrap brokers see little improvement in consumer inventories, although the decline apparently has been checked and the beneficial effects of the latest OPS price regulation, CPR 5, amendments, are expected to result in further relief. Some sellers did not apply the revised regulation until the final deadline, Oct. 30. A concerted effort is being made by the trade generally to stop upgrading even though some loopholes are said to appear in the regulations.

Buffalo — No appreciable change has been noted in the local scrap trade since recent changes in OPS price ceilings. Mills continue to receive ample stocks to maintain capacity operations.

Detroit—It is estimated scrap generation by automakers was off as much as 10 per cent last month compared with September. Model changeovers will cut November's output further.

Philadelphia—For the first time in several weeks district steel scrap consumers have been able to at least hold their own. New OPS regulations have restricted the flow of material outside the district, in the



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MOLINE, ILLINOIS

form of upgraded material and of foundry steel scrap to basic open hearth consumers. At the same time, the situation is still critical. Some leading steel mills have only a few days supply on hand.

Chicago — Insufficient time has elapsed to determine whether the revised scrap prices will increase flow of material. There has been some upward surge in shipments of No. 1 heavy melting to beat the deadline on the $1 drop in price. The new pricing will facilitate preparation and shipping of open-hearth grades but it is not regarded as an answer to the scrap shortage problem.

Cleveland—Mills are reclassifying a larger number of shipments, indicating a somewhat better inventory position. They need all the scrap they can get for winter reserves, however, and seldom reject a tonnage. Test of the full effectiveness of new provisions in the scrap price order will not be available until later this month when mills are expected to intensify their pressure for shipments.

Cincinnati—District mills are receiving scrap tonnage adequate for current operations. But stocks are far below seasonal normal. Worry over winter supply is increasing.

Birmingham — Noticeable slowing down in receipt of scrap is evident even though moderate weather conditions continue. Price revisions are expected to bring out more scrap generally, although the bulk of agricultural scrap for the season is believed moved.

San Francisco — Increase of $2 a ton for ordinary steel scrap, authorized by the Office of Price Stabilization, is viewed here with mixed feelings. Some trade observers believe it will stimulate collections. Others doubt it, though they concede some time will be saved through eliminating grade segregation.

Early estimates placed the available Korea battlefield scrap at around 1 million tons. With the return of the government mission, however, unofficial estimates have now been whittled down to between 450,000 and 700,000 tons.

Seattle—Recent changes in the ceiling price schedule on steelmaking grades of scrap have served to temporarily unsettle the market in this area. Pending digesting of the revised regulations, tonnage movement is slower.

Warehouse . . .

Warehouse Prices, Page 169

Philadelphia—A slight dip in overall warehoue business for this month is anticipated as November is a shorter month than October and has more holiday time.

Pittsburgh — Warehouse steel inventories are still declining, most noticeably in hot-rolled bars and structurals. Operators think conditions will improve in first quarter—when 100 per cent of their base period receipts from the mills will be allowed. Most are still operating on a hand-to-mouth basis.

Cleveland—Aircraft alloy steels in warehouses have been earmarked by the government for sale only for aircraft, guided missiles and atomic energy projects. Relatively few distributors are affected since stocks of such steels are not carried in warehouses generally. The action gives rise to the possibility, however, that steel may be earmarked for other programs. In fact, it is reported study is being made of the possibility of earmarking certain warehouse stocks for the shipbuilding program.

Seattle—Local warehouse operators report their stocks only 20 to 25 per cent of normal. As a result, consumers find it difficult to satisfy their requirements.

Aircraft Steels Earmarked

Washington—Aircraft-quality alloy steels in warehouses are earmarked by NPA for sale only in connection with aircraft, guided missiles and atomic energy programs in schedule 1 to order M-6A, issued Oct. 26.

Specifically, schedule 1 requires that steel producers accept purchase orders from their distributor customers for shipments of aircraft quality alloy steel products, beginning Jan. 1, 1952, up to a minimum of 100 per cent of tonnages shipped in the base period, Apr. 1 to June 30, 1951. Only electric furnace high-alloy steels made to aircraft specifications are affected.

On and after the effective date of the schedule, all distributors are prohibited from delivering, and all persons enjoined from receiving, any aircraft-quality alloy steel products unless: 1—the product will be incorporated into aircraft, guided missiles, or airborne equipment needed for production, repair or maintenance; 2—the product is required under a program bearing the allotment symbol E-2 (atomic energy).

Canada . . .

Toronto, Ont.—Production of iron and steel in Canada is headed towards new all-time record levels.

In the first eight months this year pig iron output totaled 1,667,589 net tons, comparing with 1,498,036 in the like 1950 period.

Ferroalloys production in the eight months amounted to 163,247 net tons. This compares with 114,590 in the corresponding period of last year.

During the eight months production of steel ingots and steel for castings totaled 2,386,097 net tons, including 2,307,846 tons of ingots and 78,251 tons of castings. In the corresponding period of 1950 output was 2,234,526 tons of which 2,184,189 tons were ingots and 50,337 tons steel castings.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

750 tons, king posts for cargo vessels, New York Shipbuilding Corp., Camden, N. J., to Bethlehem Steel Co.

360 tons, 4100 tons reinforcing also involved, Montana state highway bridge, Powell county, to Pittsburgh-Des Moines Steel Co.; general contract to Montana Engineering & Construction Co., Helena.

125 tons, classified government project, Washington state, to Pacific Car & Foundry Co., Seattle.

55 tons, transmission towers for Bonneville

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Power Administration, to Bethlehem Pacific Coast Steel Corp., Seattle, low $16,430.

STRUCTURAL STEEL PENDING

1000 tons, addition, Maine Township high school, Park Ridge, Ill.; Poirot Construction Co., Chicago, low on general contract.

1000 tons, (including liner plates) 1500-foot outlet tunnels, Palisades dam, Snake river, Idaho; bids to Bureau of Reclamation, Denver, to be called late November; government to furnish 200 tons shapes and 200 tons liner plates.

895 tons, section, Market street subway, Department of City Transit, Philadelphia; bids postponed to Nov. 7.

820 tons (including 320 tons guys and miscellaneous), power transmission towers; bids in to Bonneville Power Administration, Portland, Oreg.

325 tons, state girder undercrossing, Vancouver, Wash.; C. J. Montag & Son, Portland, Oreg., low.

279 tons, state bridge, Indiana county, Pennsylvania; bids Nov. 21.

243 tons, state bridge, McKean county, Pennsylvania; bids Nov. 21.

200 tons, Washington state girder span, Grays Harbor county; bids to Olympia, Nov. 14.

137 tons, state bridge, Clarion county, Pennsylvania; bids Nov. 21.

Unstated, 4-span, 190-foot I beam span, Ship creek, also 3-span, I beam, 150-foot span, Slana river, also one 50-foot and one 60-foot single span, all in Alaska; bids to Alaska Road Commission, Juneau, Nov. 18.

REINFORCING BARS . . .

REINFORCING BARS PLACED

6000 tons, miscellaneous buildings, Army Finance Center, Ft. Benjamin Harrison, Indianapolis, to Bethlehem Steel Co.

636 tons, Southern Wisconsin Colony Training School, Union Grove, Wis., to United States Steel Co., Chicago.

600 tons, Black Dog No. 2 expansion, Northern States Power Co., Minneapolis, to United States Steel Supply Co., Chicago.

203 tons, Employees' building, Union Grove, Wis., to United States Steel Supply Co., Chicago.

REINFORCING BARS PENDING

387 tons (including 237 tons bars and 150 joists), addition, Maine Township high school, Park Ridge, Ill.; Poirot Construction Co., Chicago, low on general contract.

150 tons, Washington state highway bridge, Grays Harbor county; bids to Olympia, Nov. 14.

Unstated, engineering office building, plant addition; bids to Boeing Airplane Co., Seattle, Dec. 4.

PLATES . . .

PLATES PLACED

2575 tons, tanks for various locations, including two in Philadelphia, Atlantic Refining Co., that city, to Chicago Bridge & Iron Co., Chicago.

PIPE . . .

CAST IRON PIPE PLACED

1310 tons, 42 and 30 inch cast iron pipe for Portland, Oreg., sewer system project, to E. N. Haligren Co., Seattle, for American Cast Iron Pipe Co., Birmingham, Ala.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Norfolk & Western, 15 steam switchers, to own shops, Roanoke, Va.

Southern, 100 diesel-electric locomotive units; orders placed with Electro-Motive Division, General Motors Corp., La Grange, Ill.; American Locomotive Co., New York; Baldwin-Lima-Hamilton Corp., Eddystone, Pa.

LOCOMOTIVES PENDING

Great Northern Railway, 47 diesel-electric locomotive units (26 locomotives), including fifteen locomotives of 1500-hp for road and switching duty; seven of 4500-hp for freight; two of 3000-hp for passenger service; one of 3000-hp and one of 6400-hp for freight service; purchase authorized.

RAILROAD CARS PLACED

Chicago, Burlington & Quincy, 2500 fifty-ton box and 750 seventy-ton hopper cars, to own shops.

Missouri, Kansas & Texas, 500 seventy-ton hopper cars, to Pressed Steel Car Co.'s Mt. Vernon Car Mfg. Division, Mt. Vernon, Ill.

New York, Susquehanna & Western, 35 fifty-ton box cars, to Pullman-Standard Car Mfg. Co., Chicago.

RAILROAD CARS PENDING

Fruit Growers Express, 1000 fifty-ton refrigerator cars; contemplated.

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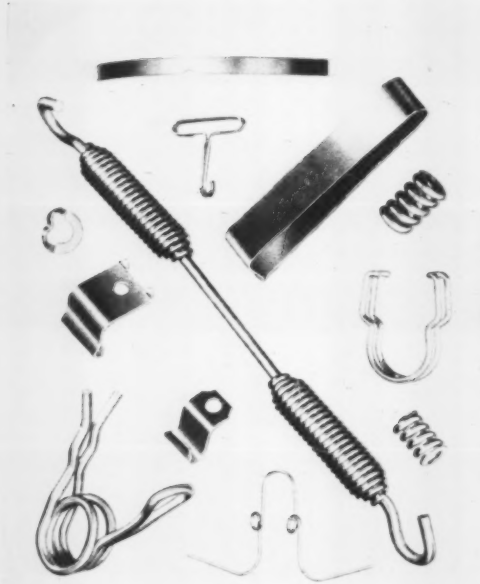

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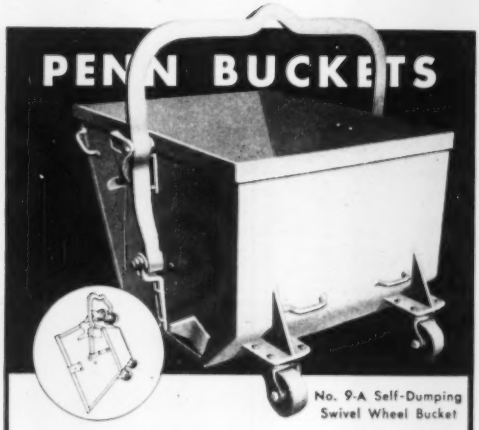

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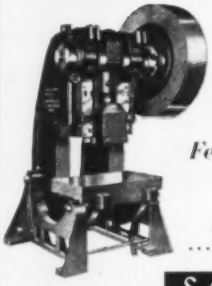

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Metalworking Briefs . . .

CONSTRUCTION—ENTERPRISE—ORGANIZATIONAL CHANGES

Fabricant Building Mill

Fabricant Steel Products Inc. is constructing a $1 million steel mill in Albany, N. Y. Bernard Fabricant is president of the company. Principal output will be electric furnace and rolled steel products. In readiness for the plant's completion, the Fabricant company has shipped one complete electric furnace to Albany where it is being stored in the Delaware & Hudson Railroad shops. Much additional equipment necessary to the construction and operation of the plant also is on hand and ready for installation. Fabricant Steel Products Inc., chartered in 1932, maintains its home office at 233 Broadway, New York, with warehouses in Williamsport, Pa.

Forging Capacity To Soar

Willys-Overland Motors Inc., Toledo, was granted a $10 million facilities contract by the Air Force to expand by 60 per cent present steel and aluminum forging capacity at its plant in that city. New equipment for manufacture of jet engine parts and other aircraft forgings is being installed.

Reactivates Navy Shipyard

Pacific Car & Foundry Co., Renton, Wash., is reactivating the Navy reserve shipyard at Everett, Wash., as an auxiliary to the main plant in furthering defense contracts. Machine shop facilities will be the first to return to active production of combat vehicles and other military items.

Plans $9 Million Plant

Consolidated Mining & Smelting Co., Montreal, awarded a contract for construction of a $9 million fertilizer plant at Kimberly, B. C. Annual capacity will be 70,000 tons of ammonia phosphate.

Cleveland Grinding Moves

Cleveland Grinding Machine Co. moved to larger quarters at 1643 Eddy Rd., Cleveland. George Banko is president of the firm which builds contour grinding machines.

Equipment Firm Reorganizes

United States Air Conditioning Corp., Minneapolis, reorganized its sales department into three separate divisions: General Equipment Division, Packaged Refrigeration Equipment Division, and Gas Equipment Division. Sales managers of these divisions, respectively, are: L. P. Hanson, D. E. Feinberg, and William Moiselle.

Cutler-Hammer Inc. Expands

Cutler-Hammer Inc., Chicago, purchased another building to permit expansion made necessary by defense contracts and orders from defense supporting industries. The building, at 11th street and W. St. Paul avenue, will provide the firm with 110,000 square feet of additional space.

Luria Expands on West Coast

Luria Bros. & Co., Philadelphia, one of the country's largest scrap metal companies, leased space for its Los Angeles offices in a building under construction at 3440 Wilshire Blvd. Luria is expected to take occupancy of its quarters as soon as it completes its own special interior alterations later this year. Joel Claster was elected president of the firm in September upon the death of Alexander L. Luria.

Hill-Chase Opens Plant

Hill-Chase Steel Co., Baltimore, opened its recently completed plant and offices at 6500 Erdman Ave., that city. The company now has a total of 62,000 square feet of operating space in its offices and two warehouses.

Federated Steel Reorganizes

Fort Duquesne Steel Co., Pittsburgh, and Hamilton Steel Co., Cleveland, are operating as divisions of the newly formed Federated Steel Corp., Oliver building, Pittsburgh. Officers of Federated are: Donald C. Lott, president and treasurer; Andrew R. Cochrane, vice president and secretary; Earnest W. Harwell and John F. Lott, vice presidents. The board of directors consists of these officers and William H. Cosgrove, president, Swindell-Dressler Corp., Pittsburgh. Eugene G. Sheasby, formerly assistant general sales manager, Fort Duquesne Steel Co., was appointed general sales manager, Fort Duquesne Steel Co. Division.

Pangborn Displays Equipment

Pangborn Corp. inaugurated a demonstration room at its plant in Hagerstown, Md., so that potential users can see blast cleaning and dust control equipment in operation. Machines on display range from a 15-ton Rotoblast monorail installation to a special miniature (90 pounds) adaptation of

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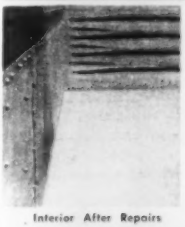
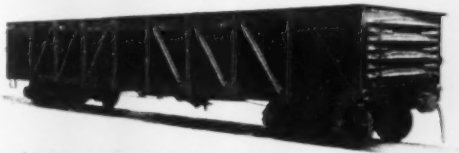


Interior After Repairs



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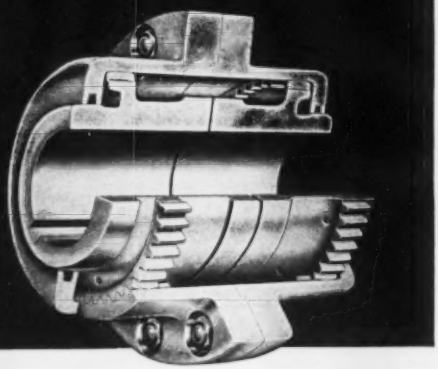

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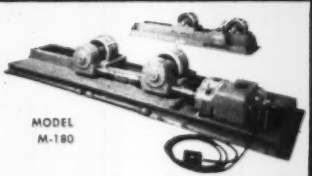

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Anchor Moves Office

Anchor Metal Products Co. moved its offices to 3959 Ogden Ave., Chicago.

Shell Grows in Houston

Shell Chemical Corp., New York, will add to its Houston operations a unit for recovering sulphur from waste refinery gases. Output of the unit will be sold for conversion to sulphuric acid. Operation is expected by mid-1952.

Corry-Jamestown Expanding

Corry-Jamestown Mfg. Corp., Corry, Pa., leased a building in that city for office space. The company is seeking sufficient structural steel to construct a new plant unit which will cost about $700,000 in addition to a $1 million plant building now under construction.

Aluminum Fabricator Expands

Washington Aluminum Co. Inc., Knecht Avenue and Pennsylvania Railroad, Arbutus, Md.—aluminum fabricator—is adding 7000 square feet to its fabricating facilities. The new space, when completed, will give the company 25,000 square feet. Ernest C. Liskey Jr. is president.

Lund Ltd. Sells English Tools

John Lund Ltd., Crosshills, Keighley, England, appointed Standard Machine & Tool Co. Ltd., Windsor, Ont., as distributor for its grinding and boring machines.

Erects Steel Warehouse

Seaboard Steel & Iron Corp., Baltimore—iron and steel distributor—is erecting an 8000-square foot addition. Henry A. Lowrey is president.

Tuthill Spring Opens Plant

Tuthill Spring Co., Chicago, is operating its new plant in Momence, Ill. Operations in Momence include manufacture of agricultural implement parts, such as spring harrow teeth, cultivator shovels, stalk cutter and lawn mower blades. The main plant in Chicago will continue to manufacture leaf springs.

Carborundum Gets Agency

Carborundum Co., Niagara Falls, N. Y., and its distributors of carborundum coated abrasives have exclusive sales rights for Cone-Loc drum sanders, produced by American Diamond Saw Sales, Portland, Oreg. This sander is a cushion-type split drum which makes it possible to use coated abrasives in low-cost strip form.

MIGHTY USEFUL: One of RCA's new Utility Series Metal Detectors checks pieces of candy for foreign metal particles in New York candy firm. The small sized Metal Detector is suitable for any application where material to be inspected can pass through a relatively small aperture

Westinghouse Canada Builds

Canadian Westinghouse Co., in connection with its $10 million expansion program, will erect two plant buildings in Hamilton, Ont., for the manufacture of electrical equipment and radar for the Army and Navy; production of electrical equipment for diesel locomotives, etc.

General Fireproofing Builds

General Fireproofing Co., Youngstown, will enlarge its plant to make airplane assemblies. The addition will cost about $500,000, while equipment worth about $1 million will be furnished by airplane firms with which General has contracts. The company's principal peacetime product is metal furniture.

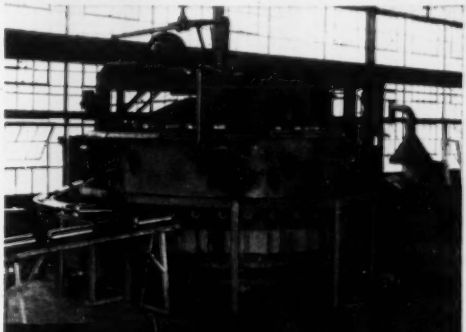
Mathieson Purchases Plant

Mathieson Chemical Corp., Baltimore, leased a government chemical plant at Morgantown, W. Va. The plant was built in World War II at a cost of $75 million and was closed at the end of the war. In 1946, it was reopened until the summer of 1950 to make fertilizer for overseas shipment.

Link-Belt Opens Branch

Link-Belt Co., Chicago, opened a factory branch store at 108 S. Fourth West St., Salt Lake City, Utah. The branch is headed by Donald W. Newsome, district manager, an engineer trans-

GASMACO FURNACES



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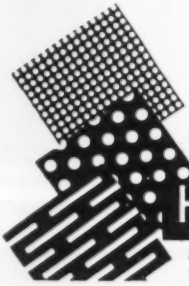

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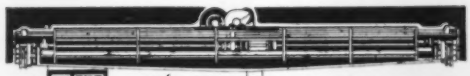

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ferred from the company's San Francisco plant. He will be assisted by Harry Hotchkiss.

Roy Industries Retools

E. Roy Industries Ltd., Montreal, is tooling for a multimillion dollar subcontract to build aircraft parts. The plant will increase its working force from 500 to 1200 within a year as a result of the order.

Clark Moves Branch Plant

Clark Bros. Co. Inc.—oil and gas well engines—Olean, N. Y., subsidiary of Dresser Industries, is moving its Huntington Park, Calif. plant to 5120 Pacific Blvd., Vernon, Calif.

American Metal Industries

A business name has been filed in the Erie county clerk's office for American Metal Industries, 1200 Niagara St., Buffalo, N. Y., by Douglas MacKenzie.

Benada Aluminum Expands

Benada Aluminum Products Co., Girard, O., plans to expand its plant in that city. The building will cost about $200,000 and will have about $300,000 worth of equipment. The addition will contain about 35,000 square feet of floor space.

Plans Lawn Mower Factory

Pennsylvania Lawn Mower Division, American Chain & Cable Co., Camden, N. J., will erect a $600,000 plant in West Pittston, Pa. The building will contain 120,000 square feet of floor space.

Spring Maker Enlarges Plant

Comfort Spring Corp., Baltimore, maker of bed and box springs, is building a 10,000-square foot addition to its branch plant on Hollins Ferry road. Manufacture of parts is done at the Fairmount plant and the assembly work at the Hollins Ferry road establishment.

Stackpole Has Second Branch

A branch plant for the manufacture of electronic components was opened in Kane, Pa., by Stackpole Carbon Co., St. Marys, Pa. The new plant contains about 45,000 square feet of floor space. The company also operates a branch factory at Johnsonburg, Pa., and its main plant at St. Marys.

C. A. Norgren Co. To Shift

C. A. Norgren Co. will move from its present location in Denver to its new and larger plant in Englewood, Colo., during the last two weeks in November. The plant will include many new units of production and materials handling equipment. The company makes pneumatic products, including oil fog lubricators, air filters, pressure regulators, relief valves and other air controls, hose couplings and hose assemblies.

Now It's Industrial Machine

Wilmer Machine Works, Baltimore, which recently moved into its new plant, containing 16,600 square feet, at 1503 W. 41st St., changed its name to the Industrial Machine Co. Blair W. Rairigh is owner.

Clements Merges Buildings

L. E. Clements Engineering Corp., Baltimore—tools, dies, stampings and plastic and rubber molds—is merging two structures into a single building containing about 7400 square feet. Its original plant contained 3000 square feet.

Line Material Moving Plant

Line Material Co., Milwaukee, manufacturer of electrical equipment, is expected to complete its move from Oneida, N. Y., to a plant now under construction in Olean, N. Y. by Nov. 1.

Foundries Get Safety Awards

Increased emphasis on steel foundry safety practice, highlighted by achievement of perfect safety records by 10 foundries, is disclosed in final results of the 1951 national safety contest announced by Steel Founders' Society of America, Cleveland. Highest award winners included: Malcolm Foundry Co. Inc., Newark, N. J.; Quincy Steel Casting Co. Inc., N. Quincy, Mass.; Weatherly Steel Castings Co., Weatherly, Pa.; Eastern Malleable Iron Co., Wilmington, Del.; Tonawanda Electric Steel Casting Corp., N. Tonawanda, N. Y.; Hughes Tool Co., Houston; Deemer Steel Casting Co., New Castle, Del.; Walworth Co., Greensburg, Pa.; Bethlehem Steel Co., Steelton, Pa.; Hanford Foundry Co., San Bernardino, Calif.; Pittsburgh Steel Foundry Corp., Glassport, Pa.

Certificate of achievement winners included: Chapman Valve Mfg. Corp., Indian Orchard, Mass.; Mackintosh-Hemphill Co., Midland, Pa.; Crucible Steel Casting Co., Cleveland; Bethlehem Steel Co., Bethlehem, Pa.; General Steel Castings Corp., Eddystone, Pa.; Symington-Gould Corp., Depew, N. Y.; Continental Foundry & Machine Co., Wheeling, W. Va.; Dayton Steel Foundry Co., Dayton, O.; Massillon Steel Casting Co., Massillon, O.; Duriron Co. Inc., Dayton, O.; Crane Co., Chicago; General Steel Castings Corp., Granite City, Ill.

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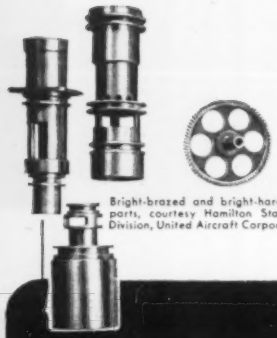

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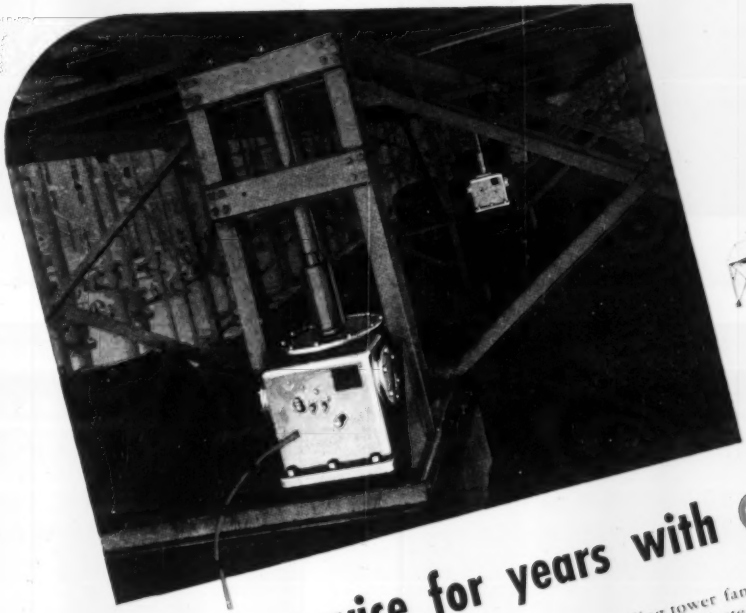

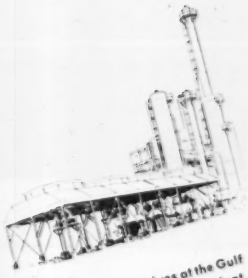

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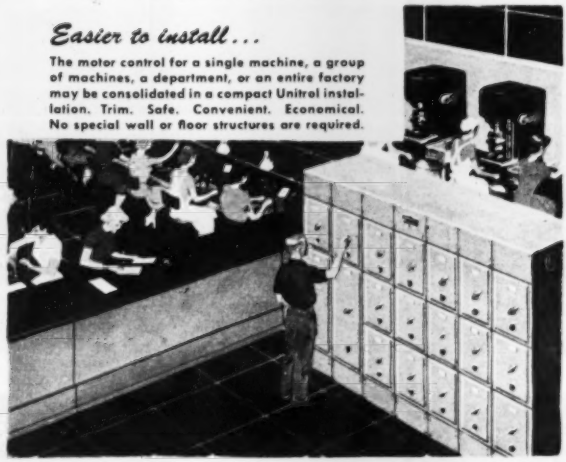
The motor control for a single machine, a group of machines, a department, or an entire factory may be consolidated in a compact Unitrol installation. Trim. Safe. Convenient. Economical. No special wall or floor structures are required.



Easier to modify . . .

When changing production requirements force replacement, rearrangement or relocation of controls, Unitrol allows such changes without waste of time and materials. Being completely standardized, Unitrol may be expanded or reorganized repeatedly.

Easier to maintain . . .

Unitrol's compact grouping of controls that are usually so widely scattered makes inspection safer, more convenient, more certain of regular attention. Control equipment housed in Unitrol is safe from mishap, tampering, and abuse.

In the few years since Cutler-Hammer engineers introduced Unitrol, the first standardized flexible control center, it has been applied to almost every conceivable motor control need. The list of Unitrol users today reads like a roster of America's leading industrials. Not many developments which completely revise existing practice win the quick acceptance and tremendous popularity that have been accorded Unitrol. It *must* be better!

Unitrol *is* better. First, Unitrol simplifies the planning of any required motor control installation. Its dimensions are *known* and its layout can be made part of the floor plans. Its cost can be estimated *accurately*. Next, Unitrol saves time and expense in installation; no special wall or floor preparation is required; no tedious, costly mounting and wiring of varying sized enclosures. And finally, in operation, Unitrol provides uncluttered space about machines for operators and materials handling; simpler, safer, tamperproof pushbutton control; inspection so convenient it is not neglected. Unitrol is *the* motor control of the future . . . tomorrow's motor control *today*! CUTLER-HAMMER, Inc., 1211 St. Paul Avenue, Milwaukee 1, Wisconsin. *Associate:* Canadian Cutler-Hammer, Ltd., Toronto.

The name UNITROL is a Cutler-Hammer trade mark registered in the United States Patent Office. It identifies the genuine and original standardized flexible control center, an outstanding engineering achievement pioneered by Cutler-Hammer, Inc.

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